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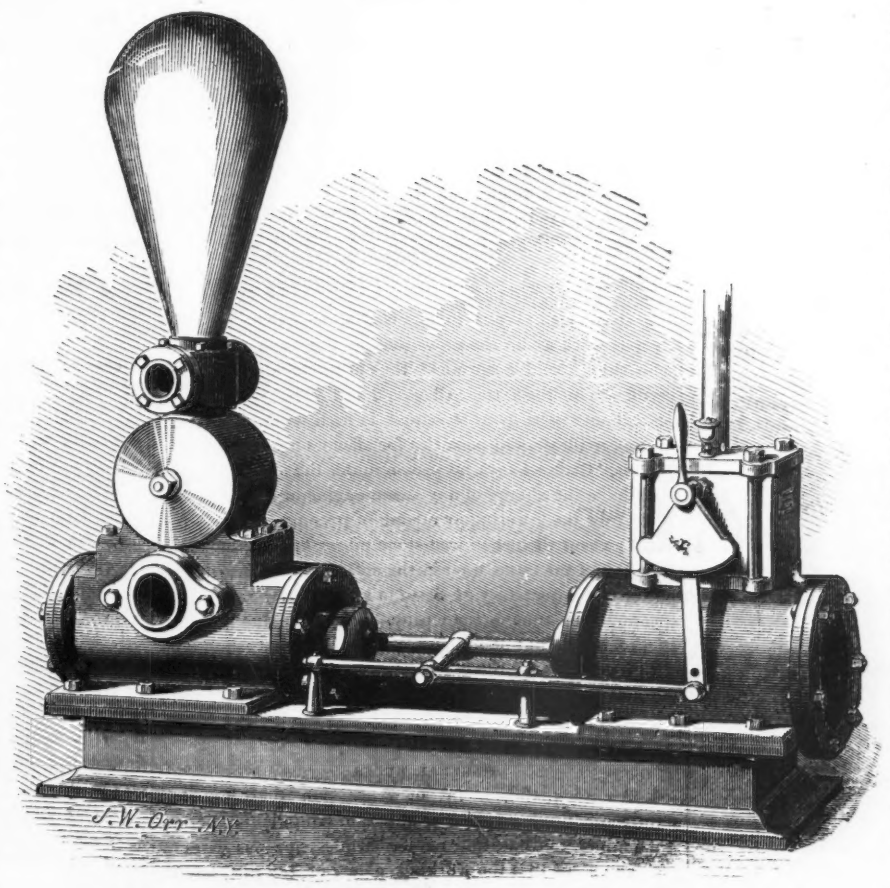
STEAM PUMPS.

We give this week an accurate engraving of Hardick's patent Double-Acting Steam Pump and Fire Engine,which is manufactured by Campbell & Hardick Bros., Niagara Steam Pump Works, No. 9 Adams street, Brooklyn, N. Y. The manufacturers claim that this pump combines all the advantages of other styles now in use, and among other peculiarities rendering it of particular value in mining operations, the following are cited: The patent steam valve applied, enables it to start from any point of stroke; by simply opening the valve in the steam pipe, the pump proceeds at once, without the use of a starting-bar, or the annoyance of pulling at a fly-wheel to get it off the centre; it will also start at any distance from the point where the steam is generated; it will work under water in every respect as well as when dry; it can be driven with a pressure of water in the place of steam, and the valves can be removed by unscrewing one nut, and the valve chest cleaned in a few minutes. Either metal or leather packing can be used in the pump cylinder, a mould being furnished for forming the latter. The valve chest and the valves are made of brass or composition, aad can be easily repaired or replaced. Any carpenter can readily make of some heavy wood, a set of valves for this pump, should the necessity arise. As a boiler-feeder, it is said to be incomparable, running at any speed to suit the work it has to perform. Such advantages, combined with peculiar simplicity of construction, easily comprehended by any mechanic, render it deserving the attention of all mining men, and others engaged in enterprises in which accurate and powerful mechanical appliances are needed. Our readers will remember that this pump took the first prize, after thorough competitive trial at the last Fair of the American Institute, in 1867. It was illustrated in our columns several years ago, and the reason for calling attention to it again is found in the various reports which have been in circulation, calculated to injure its reputation. It is said that the grooves in the piston of the steam-valve were covered by an older patent; but this feature being deemed unessential and even detrimental by the proprietor of the Niagara Pump, was discarded in July, 1868; and the pumps manufactured since that date are not liable to action for infringement. Even with regard to those on which action has been brought, Mr. HARDICK is sanguine of a verdict, and in a circular concerning the suit —which we print in another column—expresses the hope that no one will be frightened into paying a royalty to pretended inventors on the arrangement referred to.



HARDICK'S PATENT DOUBLE-ACTING STEAM PUMP AND FIRE ENGINE.

FOR THE AMERICAN JOURNAL OF MINING.

UNDERGROUND.

FROM "HENRY OF OFTERDINGEN," AN UNFINISHED NOVEL, BY NOVALIS.

TRANSLATED FROM THE GERMAN, BY BENJAMIN SMITH LYMAN.

II.

Sir, said the old man, as he turned to Henry, and dried his eyes, it must be that mining is blest by God! For there is no art that makes its followers luckier, that more awakens faith in a heavenly wisdom and care, and keeps the heart more purely guiltless and childlike. The miner is born poor, and poor he goes to his grave. He is satisfied to know where the metallic powers are found, and to bring them to light; but their dazzling splendor has no power over his pure heart. Unkindled by dangerous madness, he rejoices more over their wonderful shapes and the strangeness of their source and of their resting-places than over owning them with their unbounded promises. They have for him no charms any more when they have become merchandise, and he seeks them amid a thousand dangers and hardships in the fortresses of the earth, rather than follow their call into the world, and strive after them on the surface of the ground with cheating and cunning arts. Those hardships keep his heart fresh and his mind strong; he enjoys his scanty wages with soul-felt thankfulness, and comes up every day with renewed enjoyment of life out of the dark caverns of his calling. He alone knows the charm of light and rest, the goodness of the free air and of a wide outlook; to him alone do food and drink taste thoroughly refreshing and devout, as it were the body of the Lord; and with loving and tender feelings does he walk among his peers, or cheer his wife and children, and thankfully delight himself with the fair gift of familiar talk!

His lonely business keeps him a great part of his life away from daylight and from fellowship with men. He does not accustom himself to a dull lack of feeling towards these lofty, deep-meaning things, and he keeps the childlike frame of mind in which everything shows itself to him with its own spirit and in its first bright-colored wondrousness. Nature does not wish to be owned solely by one man. As a thing owned she changes herself into a bad poison that scares away rest, and brings on the ruinous lust to draw everything into the circle of the holder, and with it she brings an endless train of cares and wild passions. So she secretly undermines the groundwork of the owner, and brings him soon in the yawning gulf, that she may go from hand to hand, and little by little satisfy her wish to belong to every body.

On the other hand, how quietly the miner works in his deep solitudes far away from the restless hubbub of day, and only quickened to harmony by thirst for knowledge and by love. He thinks in his loneliness of his comrades and their families with hearty goodwill, and feels ever anew the needfulness of men one to another and their kinship. His calling teaches him untiring patience, and does not allow his mind to lose itself in useless thoughts. He has to deal with a wonderfully hard and unyielding power, that is to be overcome only by stubborn industry and steadfast watchfulness. But what a rare growth blooms for him in the awful depths, real trust in his heavenly father, whose hand and forethought are shown to him every day by unmistakable signs. How many countless times have I not sat in the mine at the face, and by the light of my lamp looked on the homely crucifix with the heartiest devoutness! There did I first rightly take in the holy meaning of this mysterious image, and open up the richest vein of my heart, one that has yielded me everlasting gains.

The old man went on after awhile, and said: Truly that must be a godlike man who first taught men the noble art of mining, and hid in the bosom of the rocks this picture of human life. Here the vein is thick and crumbling, but poor; there the rock pinches it into a wretched, trifling cleft, and just here the richest ores are struck. Other veins lessen its richness, until a kindred vein kindly joins it,and raises its worth immeasurably. Often it splits up before the miner into a thousand strings; but full of patience he does not let himself be frightened, he keeps quietly on his way, and sees his zeal rewarded when he discovers it soon again in new thickness and kindliness. Often a treacherous leader entices him out of the true course; but soon he knows the way is wrong, and he drives right across by main force until he has found the true ore-bearing vein again. How well the miner learns here to know all the humors of chance, but how surely also the fact that zeal and steadfastness are the only unfailing means to master them, and to wrest from them the stubbornly guarded treasure.

Of course, said Henry, you have no lack of enlivening songs. I would say, rather, that your calling must stir you up to singing in spite of yourself, and music must be a welcome companion to miners.

You have spoken the truth there, answered the old man, singing and cithera playing belong to the life of the miner, and no rank in life can enjoy their charms with more pleasure than ours does. Music and dancing are real joys for the miner; they are like a cheerful prayer, and looking back on it and forward to it help to brighten and shorten the long loneliness.

If you please, I will treat you forthwith to a song that was much sung in my youth.

Him who Earth's depths doth measure
She doth as lord revere;
Who findeth only pleasure
Within her bosom dear.

Who, at her stone limbs peering,
Their hidden plan doth know,
And downwards all unfearing
Doth to her worship go.

He is with her united!
And heartily allied;
She hath his love excited,
As if she were a bride.

He looketh on her daily
With love renewing zest,
And busieth him gaily;
She leaveth him no rest.

She favoreth him greatly,
And doth him kindly show
The story grand and stately
Of ages long ago.

Upon his face is streaming
The air of early time,
And through the dark clefts beaming
A deathless light sublime.

He ever in his courses
Descrieth well known land,
And gladly help her forces
The working of his hand.

Him will the waters follow
Right helpful up the hill;
To him each rock-closed hollow
Its treasure open will.

To the king's house he letteth
A golden flood pour down;
With noble gems he setteth
Full many a kingly crown.

True to the king he reacheth
His gifted hand, be sure;
Yet small return beseecheth
And joyful liveth poor.

On plains in purple fountains
Blood gusheth for reward;
He still is on the mountains
The world's lighthearted lord.

The song pleased Henry highly, and he begged the old man to give him still another. The old man was willing, too, and said: I know, sure enough, another wonderful song, that comes we do not know whence. A traveling miner brought it to us; he came from a great ways off, and was a remakable user of the divining rod. The song pleased much, because it sounded so strangely, almost as dark and hard to understand as the music itself, but for that very reason drew us so beyond measure, and in waking hours entertained like a dream.

I know where stands a castle strong;
A quiet king of ample powers
Abides there with a wondrous throng,
And never even mounts his towers,
All hidden in his pleasure hall,
That unseen guards are safely keeping;
There only well-known fountains sweeping
Down from the mottled roof do fall.

Whatever their bright eyes did view
In mansions of the constellations
They give him full report and true,
And never tire of their narrations.
He bathes himself within their flood,
Clean washes all his limbs so tender,
And bright his beams shine forth with splendor,
Out from his mother's clear white blood.

Old is his castle, strange and rare;
It sank down, out of deep seas falling,
Stood firm, and stands forever there,
Escape unto the heavens forestalling.
From thence around his subjects all
A subtle hidden bond is lying;
And clouds like conquering flags are flying
Adown the lofty rock-built wall.

A vast, immeasurable race
Around the fast-shut portals presses;
Each fills a faithful bondsman's place
And with sweet words his lord addresses.
They lay to him good luck alone,
And dream not that they have been captured;
By blinding fondness still enraptured,
The galling yoke they have not known.

But few are crafty and awake,
And never for his gifts are pining;
Unceasingiy they undertake
The ancient castle's undermining.
Wise hands alone can take away
The deep old curse of resting hidden;
If once laid bare the halls forbidden,
Then dawns the light of Freedom's day.

The busy find no wall too high,
The brave go down the deepest hollow;
Who on their heart and hand rely
Upon the king's track promptly follow.
Him from his chambers forth they shove,
The spooks they chase with others faster,
The raging floods they fully master,
And make them raise themselves above.

The more he now comes forth to sight,
And madly round the earth he charges;
The more is closely curbed his might,
The number of the free enlarges.
At length through empty keep shall roam,
From every hindrance freed, the ocean,
And bear us with green wings' soft motion
Into the bosom of our home.

California Marble.

The Visalia *Delta* of Feb. 24, has the following concerning the marble of Tulare county:—

"Mr. Palmer left at our office a specimen of the finest quality of marble we have ever seen in the State. It is equal in texture to, and is susceptible of as high a polish as any Italian marble we have ever seen; and our informant says there is a sufficient quantity where this specimen came from to supply the whole North American continent for years and years. Combined with it in the same mountain is first class limestone with abundance of wood and kiln stone for making lime. And then the beauty of this discovery is, that a splendid carriage road can be made to the quarry for $1,000. It is about twenty-five miles east of Visalia. We have scarcely begun to find out the resources of Tulare. Along her mountains we have the largest trees in the world, and more of them than any given locality: better lumber forests than are to be found on the coast, either in quantity or quality; as fine and extensive marble deposits as are to be found anywhere; hundreds of mines—both copper and gold—that when developed, will yield their owners princely fortunes.

Practical Letters.

[WRITTEN FOR THE JOURNAL OF MINING.]

THE INSPECTION OF MINES.

BY J. W. HARDEN, OF WILKSBARRE, PA.

Mr. BEARD'S Act for the inspection of coal mines in Schuylkill County has been sent to the mining engineers of the Wyoming Valley for the purpose of obtaining their opinion and suggestions upon it, with a view to an Act for Luzerne County. Having some acquaintance with the Mines' Inspection Act of England and its working, I am of opinion that there are other of its provisions which, judiciously applied, would not be without their value.

The first Act of Parliament for the regulation of collieries in England was passed in 1842. By this act women and girls, and boys under 10 years of age were prohibited from working under ground. The Secretary of State was empowered to appoint inspectors, with authority to enter any colliery by day or night, but this power was exercised only occasionally, and the inspector's appointment was not made a permanent one until after several serious explosions and prolonged investigations towards the close of that decade. In 1850 continuous inspection was ordained under this act, the provisions of which, though working satisfactorily as far as they went, and to the advantage of both employer and employed, were in 1860 repealed, to make way for a more extended act, coming into operation in 1861.

Before the passing of any of these acts the larger collieries of the north of England and a few of those of other districts were probably as well managed as now. They had their printed regulations, and discipline was well kept up. Yet, taken as a whole, government inspection has done much towards increasing the value of the mines of the country, and reducing the damage by accidents. The following is epitomized from the act of 1861, now before me:

The first clause provides that no boy under 12 years of age shall be employed in any coal mine, excepting those then at work under the provisions of the former act, but who shall spend a specified time at school also, and give certificate of the same. Clauses 2 and 3 specify the number of hours to be spent at school in each week, the nature of the certificate, and penalties for offences against the provisions. Clause 4 says, no person under the age of 18 years shall have the charge of any steam engine or machine that is used for the lowering or raising of persons. Clauses 5, 6 and 7 extend the act to iron-stone mines, and explains the meaning of the terms used in the act. Clauses 8 and 9 give power to the Secretary of State to appoint and remove inspectors from time to time, provide for the due publication of all such appointments, and define what shall constitute unfitness for the office. Clause 10 provides that the following rules, to be called General Rules, shall be observed in every colliery and iron-stone mine by the owner and agent of the same.

GENERAL RULES.

1. An adequate amount of ventilation shall be constantly produced in all coal mines or collieries and iron-stone mines, to dilute and render harmless noxious gases to such an extent that the working places of the pits, levels, and workings of every such colliery and mine, and the traveling roads to and from such working places, shall, under ordinary circumstances, be in a fit state for working therein.

2. All entrances to any place not in actual course of working and extension, and suspected to contain dangerous gas of any kind, shall be properly fenced off so as to prevent access thereto.

3. Whenever safety lamps are required to be used, they shall be first examined and securely locked by a person or persons duly authorized for the purpose.

4. Every shaft or pit which is out of use, or used only as an air shaft, shall be securely fenced.

5. Every working and pumping pit or shaft, shall be properly fenced when operations shall have ceased or been suspended.

6. Every working and pumping pit or shaft where the natural strata under ordinary circumstances are not safe, shall be securely cased or lined or otherwise made secure.

7. Every working pit or shaft shall be provided with some proper means of communicating distinct and definite signals from the bottom of the shaft to the surface, and from the surface to the bottom of the shaft.

8. All underground self-acting and engine planes on which persons travel, are to be provided with some proper means of signalling between the stopping places and the ends of the planes, and with sufficient places of refuge at the sides of such planes at intervals of not more than twenty yards.

9. A sufficient cover overhead shall be used when lowering or raising persons in every working pit or shaft, where required by the inspectors.

10. No single-linked chain shall be used for lowering or raising persons in any working pit or shaft, except the short coupling attached to the cage or load.

11. Flanges or horns of sufficient length or diameter shall be attached to the drum of every machine used for lowering or raising persons.

12. A proper indicator to show the position of the load in the pit or shaft, and also an adequate break, shall be attached to every machine, worked by steam or water-power, used for lowering or raising persons.

13. Every steam-boiler shall be provided with a proper steam-gauge, water gauge, and safety valve.

14. The fly-wheel of every engine shall be securely fenced.

15. Sufficient bore-holes shall be kept in advance, and, if necessary, on both sides, to prevent inundations in every working approaching a place likely to contain a dangerous accumulation of water.

The 11th and four following clauses provide that in addition to the general rules there shall be established in every colliery and iron-stone mine such other rules, to be called Special Rules, for the conduct and guidance of the persons acting in the management, and all persons employed in or about the same, as under the particular state and circumstances of such colliery may appear best calculated to prevent accidents; and that the owner shall frame and transmit to the Secretary of State such special rules for his approval. Should the Secretary of State not approve, and the owner reject his amendments, provision is made for arbitrators and an umpire. It is provided that the special rules may be amended from time to time; that both the general and special rules shall be printed and hung up in the business places of the colliery, and a copy of them supplied to every person employed. Clauses 16 and 17 provide for the entry and inspection by the inspector, by day or night, the owner to provide the means for his doing so; and in case of disagreement in opinion between the owner and inspector as to the necessity of any particular or further provision to be made for the better security from accident, arbitration is provided. Clauses 18 and 21 provide for the keeping of accurate maps of the workings of the mine, for their being periodically and properly made up and kept for examination, for notice to be given the inspector of the opening of any new works or the abandonment of old works, and for a secure fencing off of the latter.

Clauses 19 and 20 provide that in case of loss of life or dangerous accident the Secretary of State and the inspector of the district shall within twenty-four hours be made acquainted therewith, and in case of death that the coroner shall adjourn the inquest for the attendance of the inspector or some other person on behalf of the Secretary of State; but an interment of the body may be ordered.

Clauses 22 to 26 provide for the infliction of penalties or imprisonment for offences against the act, and stipulate that no justice of the peace being the owner, or any relative of the owner or the agent, of the mine where the offence is committed, shall act as a justice of the peace for the purpose of adjudicating thereon; and that a certified copy of the rules shall be evidence that such rules have been established.

Clause 27 says every inspector shall every year make a report in writing to the Secratary of State, of his proceedings during the year, which report shall be laid before both Houses of Parliament.

Clauses 28 to 31 provide that every person employed shall have his wages paid to him by his immediate employer in money at an office in the colliery; that such office shall not be contiguous to any public house or saloon where beer or spirits are sold, and that, where the coal or iron-stone is obtained or measured by weight, it shall be lawful for the persons mining it to appoint one of their own body to see it weighed, in order to take an accurate account thereof.

[FOR THE JOURNAL OF MINING.]

THE SALT LAKE OF WIELICZKA.

(Translated from *Die Natur* by R. Henseckel, Mining Engineer.)

The great event of the breaking through of water into the salt mine of Wieliczka, in Galicia, which has not only given such important materials for discussion to geologists, but also called forth the interest of the whole educated world, has in most cases been so wrongly described that a true statement of the facts will be of value.

Before proceeding to the description of the catastrophe itself, it may be necessary to make a few remarks as to the geological nature of the country.

In studying a geological map of northern Europe, the attention is called to the great extent of the middle tertiary deposits, which begin, enclosed by the Jurassic strata, on the northern slope of the Alps, and stretch without interruption far to the eastward. These tertiary formations undergo, near St. Polten, Lower Austria, a strong contraction, caused by the Carpathian mountains, but increasing afterwards considerably in breadth, fill the lowlands around Vienna, and suffer a second and very considerable contraction near Wieliczka, where they are bounded north by older formations, and south by the Carpathian sandstone, and exhibit an entire breadth of only 6,000 to 7,200 feet. These tertiary strata, known in the district be

tween the lakes of Geneva and Constance, under the name of "Molasse," consist there of clayey schists, intermixed with sand, and sometimes a kind of conglomerate called "Nagelflue." The observation has long ago been made, that the beds lie horizontal towards the Jura mountains, appear more and more upheaved in proportion to the diminishing distance from the Alps, and finally apparently underlie beds of an older formations (here the Cretaceous.)

Different observations made in Switzerland have shown that a continuous line can be followed, along which these folds are to be observed, and which is called "the anticlinal line of the Swiss Molasse." This is not shown as a distinct chain of hills, but rather by the inclination of the strata. From it we may draw the conclusion that the Alps were elevated after the Molasse had been deposited, and that a pressure toward the exterior was thus caused. The well-known Swiss Geologist, FAVRE, made near Geneva the observation, that the steep chain of Mount Saleve, belongirg to the Jurassic formation, stands quite isolated in level "Molasse-land," and that the layers of the Molasse land lean in a tilted and folded position against it—a further proof of the elevation of the Alpine system after the deposition of the Molasse.

In the nearest vicinity of Wieliczka are to be found, in the district of the tertiary formation, several isolated occurrences of older rocks, of jurassic or cretaceous origin, very properly christened by the name of "Cliffs," against which the layers of Molasse lean in the same manner as at Mount Saleve. Through this chain of tertiary deposits which, as has been mentioned already, is near Wieliczka only between 6,000 and 7,200 feet wide, and which on one side is limited by older formations and on the other side by the northern slope of the Carpathien mountains, runs that anticlinal line, beginning in the Molasse-land, to which we have alluded, and the existence of which has been but too plainly illustrated by the recent lamentable event in the salt mine.

When sea-water is evaporated, the differentsalts crystallize in a certain succession, according to the laws of "dissociation," and in the reverse order of their solubility. First are precipitated the oxide of iron, and other combinations of the same metal; later, carbonate of lime, sulphate of lime, chloride of sodium, chloride of magnesium, then the combinations of bromine; and finally, only when the solution is most highly concentrated, the combinations of potassium or "potassium-salts."

This dissociation is exemplified in the salt mine at Stassfurt, Prussia, where the potassium-salts were found in those clays which formed the hanging wall. Originally, these potassium-salts were thrown aside as useless; but soon their value as fertilizers became known, and at the present time Stassfurt owes much of its industrial importance to the accumulation of these salts. After this discovery in Prussia, the Austrian government also paid more attention to its salt-works, and several close investigations were undertaken to ascertain whether chloride of potassium, as well as sodium, could be found in the Austrian brines.

In December, 1866, a report was published on the salt-works of Wieliczka, which gave very little hope in this respect; since, in the then opened parts of the mine, no potassium-salts had been found. In February, 1867, a report was published on a salt-work near Kalusz, with detailed analyses, according to which a considerable quantity of potassium-salts was to be found there, and in consequence of that a closer investigation took place at Wieliczka; but this was carried out with very little care for the geological conditions of the locality.

The accompanying sketch shows a section of the salt-mine.

0. A bed of tertiary sand, about 360 feet thick, and carrying a vast quantity of water; underlain by

1. "Tegel" clay, containing marine fossils, but no salt, and having about the same thickness.

2. A bed 180 feet thick of salt-clay, inclosing irregular bodies of salt, which often have a size of several thousands of cubic feet. (These salt bodies are called "Gruensalzkoerper.")

3. A bed 36 feet thick of rock-salt, contaminated with clay, lignite, etc. ("Stinkasalz")

4. A bed of about the same thickness, of the purest fine-grained rock-salt, ("Schybikersalz.")

A. "Francis Josef" shaft.

B. "Alt Regis" level.

C. "Haus Oesterreich" level.

D. "Rittinger Horizont" level.

The level Haus Oesterreich was selected for the search of the potassium, as it was most advanced towards the hanging-wall of the salt-clay. As no favorable result had been gained, after having continued the level in the salt-clay for a length of 75 "klafters" (450 feet), it was concluded to make its entire length 125 "klafters" (750 feet), reckoned from its beginning.

The first traces of water were noticed on the 19th of November last year, from which time it increased so rapidly that already on the 23d of the same month the water-level could not be kept down, and on the 24th a report of the fact was dispatched to the "Bergamt" or Mining Bureau of the salt mines of Galicia. The great quantity of pure quartz sand, free of any clayey mixture, which the water carried, left no doubt as to its origin. It could not have been inclosed in the "Tegel," but necessarily must have originated in the overlying marine tertiary sands, especially since also fossils belonging to that formation were found in it. The work had, therefore, arrived at the contact-line of the "Tegel" and the tertiary sand (*m*).

A telegram of November 24th gave the water as 50 cubic feet per minute, mentioning at the same time that a considerable diminution was observable. This was on November 30th ascertained with certainty, so far that the affluence of that day was pronounced to be equal to 30 cubic feet per minute. The first authentic report was received December 1st, and contained the following statement:

"November 22d there occurred on the level Haus Oesterreich 110 'klafters' (660 feet) below the surface, northward of the Frances Josef shaft, a breaking in of muddy water, mixed with sand, appearing to originate from the non saliferous clays which are deposited nearest to the boundary of the formation. The first dams built to restrain it could not resist the pressure, and the timbering became injured. It was therefore deemed necessary to erect at short intervals, one behind the other, three other dams of masonry nearer to the entrance of the level than the first one. On November 30th, the water measured in the deeper openings 11 feet in depth, and the work had to be pushed forward with all possible speed to prevent the entire filling up of the lower levels. For greater security yet, a fourth dam of wood was erected; and thus all possible measures were taken to stop the flow of the water. The stability of the dams depends upon the dissolving power of the water, but it is not to be feared that it will wash around the dams, as its dissolving power is not very efficacious in solid rock-salt."

In spite of this confident report, the dams, which only could have been of use if they could have been built in the "Tegel," proved nearly fruitless, as might have been foreseen in the salt-rock, since the first was undermined in an hour and a half, and the others in the course of the next day. They were in so far profitable, however, as the sand collected behind them and broke the force of the water-current, in consequence of which the affluence decreased again to 25 cubic feet per minute.

The next thing to be done was to conduct the water to the deeper levels, where it could extend without greater injury. The most important working places, and at the same time those which extend under the city of Wieliczka, are above the Rittinger Horizont. Exact examinations have shown that, should the water accumulate in this proportion (25 cubic feet) it would require more than three and a half months before it would reach the Rittinger Horizont; but if ever it should reach that level, there would be the greatest danger not only for the mine, but also for the town itself. It is the most important problem to keep the water in depth, i. e., below the Rittinger Horizont, until sufficient pumping machines are on the premises, with the help of which they may succeed in clearing even the deeper levels again.

In a few weeks there will be at disposal over 400 horse-power, which will hoist 145 to 150 cubic feet of water per minute, or five-fold the quantity of the present affluence. In five or six months it will be possible to overpower all the water, and then either to stop the affluence entirely or to regulate it so that a constant water-lift will remove all further danger.

The concluding verdict can only be that the disaster is due to the neglect of the management, in its investigations of the geological relations of the deposit. It was necessary and possible to know:

1. That potassium-salts, it they are not found on the salt-clay, cannot be found in the non-saliferous hanging-wall "Tegel;" and

2. That when a level was to be driven so far it should have been done with the necessary precaution. The folds of the layers should have been kept in view, in order that the entire hanging wall should not be, as it was in this case, ignorantly traversed.

Discovery of Platinum in Scotland.

According to a brief account in the London *Mining Journal*, an explorer announces that, during its investigation into the auriferous nature of Scotch quartz, he has discovered small quantities of platinum associated with the gold there existing. The platinum exists in the form of small scales resembling silver, but they are not magnetic like much of the crude platinum found in South America. In the process employed the gold was volatilized by chlorine at a bright red heat, but the platinum was left unacted on by the chlorine. Platinum is very rarely found in this country. Some ten years ago, Mr. W. Mallet, of Dublin, found crude platinum in minute grains and scales associated with gold, wood, tin, etc., in the auriferous sands of some of the Wicklow rivers; about the same time it was also said to have been met with on a farm near the mouth of the river Urr, in Buittle, Kirkcudbright. Platinum has also been found near Loch Cambead.

Mining Summary.

GOLD AND SILVER.

Nevada.

The Report of the Nevada State Minerologist, Rev. A. F. WHITE—1867–'68, is noticed in the Virginia city papers, just received from the press. The following extracts, with comments, are given by the *Enterprise*:—

MILLS AND STAMPS IN THE STATE.

The following table contains a nearly accurate list of the number of mills, stamps and their cost in the several counties of Nevada:

Counties.	No. Mills.	No. Stamps.	Cost.
Ormsby	8	175	$ 450,000
Washoe	10	281	1,450,000
Storey,	36	655	2,575,000
Humboldt	9	69	320,000
Lander	29	289	1,645,000
Nye	11	121	686,500
Lincoln	2	20	200,000
Churchill	4	40	300,000
Lyon	41	543	1,367,600
Douglas	..	...	.....
Esmeralda	14	160	490,000
Total,	158	2,363	$9,444,100

The author admits that this table is not entirely accurate. Since the statistics were collected several mills have been taken down in various parts of the state. Some have been reconstructed in White Pine, while others are on their way thither, and to other newly discovered districts. Upon the whole it is as nearly correct as can be made in a country of such sudden and extreme changes.

BULLION PRODUCT FOR 1868.

We are furnished with the following figures in relation to the bullion shipped from the State during the year 1868:

By Wells, Fargo & Co., for	
First quarter	$2,494,352 00
Second quarter,	3,951,617 00
Third quarter,	4,391,380 00
For October,	1,265,934 00
	$12,103,373 00
By the Pacific Union Express returns to Dec. 31, only from Virginia City,	722,261 19
Total,	$12,825,534 19

The deficit for November and December is approximately supplied by Mr. White. Estimating the shipments made by Wells, Fargo & Co., in October, as an average, the amount shipped in November and December was probably $2,531,848. It is supposed that the shipments made from Eastern Nevada by the Pacific Union Express, and from various districts by private parties, are ample to make an aggregate for the year of at least $16,000,000. It appears from reliable authority that since the discovery of the mines, Nevada has added $100,000,000 to the wealth of the world.

THE LEGAL DIFFICULTIES OF THE EBERHARDT MINE.

The White Pine Correspondent of the Virginia City *Enterprise*, writing from Treasure City, Feb. 18, gives the following interesting account of the most prominent mine of that locality—the Eberhardt: "In my last I promised to give you all the ins and outs of the legal difficulties of the Eberhardt. I have mapped the ground out and hunted up the dates, but I find it such a lengthy affair that I rather recoil from the task of putting it on paper, and fear that if I go on your readers would not have the courage to go through it, notwithstanding the intense interest felt in the matter, as the contest is by no means ended yet. It promises to be the "*cause celebre*" of the coast, unequalled since the great new Almaden case, which brought Attorney General Black and Secretary Stanton to San Francisco to participate in the forensic strife. The Eberhardt case is now in the Supreme Court, with the possibility of a new trial being ordered in the court below, and the strife indefinitely continued. Taking this fact into consideration, and also the fact that they have just struck another rich deposit of silver (it is almost a misnomer to call it ore) at 100 feet depth, I believe I will go through with my plan as started. If you deem it too technical you can pass it.

MAP OF THE GROUND.

"You must make this first. It is not difficult. Take a sheet of writing paper and a pencil and follow my directions and we'll have a map in short order. Take half a sheet of ruled letter paper, and turn it so that, as it lies before you, the lines will be perpendicular. If you want to have a correct map, take a rule divided into sixteenths of an inch, and follow the scale, which will be 32 feet to the inch. Every one of the sixteenths represents two feet. If you are too lazy to do that, yet still feel a little curiosity in the matter, take a large sheet of paper and measure the first distance given, and you can follow the rest with your eye near enough to get along with. Now draw a firm, straight line from left to right clear across the paper as near as you can to the upper edge of the sheet. That represents the north wall of the ledge running due east and west, the left-hand side of the paper being west, and the top north, of course. Now on the fifth ruled line from the left side of the paper, measure downwards from the north wall 40 feet; this will be on our scale, 20 of the 16th-inch spaces, or an inch and a quarter. Make a dot there and mark it "Moffet Shaft." This is the initial point of location of the Eberhardt ledge. A tree stands there on which the notice was put. It was out of this shaft Sproul took the first ore extracted from the vein. This is the boundary line between the Eberhardt North and the Eberhardt South. Now you must remember, that when the ledge was taken up it was supposed to run from north to south, but when the case was tried at Austin the jury were of the opinion, from the evidence given, that it ran east and west, and it was considered that the north wall ran as you have it now on your map, if you have followed me. The north Eberhardt now takes the portion west of the Moffet shaft, and the South Company the eastern portion.

Now, with this initial point established, the rest is easy. From the Moffet shaft draw a line due east, clear across the paper, parallel with the north wall. On this line, 29 feet east of the Moffet shaft, make another dot. This is "Shaft No. 3." At 30 feet farther east from shaft No. 3 make another dot. This is "Shaft No. 2." Don't neglect these, because the Eberhardt won their case by reason of these works, as you will soon see. Fifty-four feet from Shaft No. 2, on same line, make another dot. This is the southwest corner of the Keystone claim. Now from this last dot run a straight line due north to the north wall line at the top of the paper. Now you have a correct map of the Key-

stone claim as far as opened. This line you have last drawn is the western boundary of its present workings. It runs out east several hundred feet. Its southern boundary is marked already, being a portion of the line on which are the Moffet, and No. 2 and No. 3 shafts. Mark it "Keystone Company," and now we will mark out the space from whence the great body of the rich ore is taken from the Eberhardt. Go to the southwest corner of the Keystone claim. Draw a straight line 60 feet, thence due east 70 feet, thence north to the southern boundary of the Keystone. The space enclosed by these lines is called the "Eberhardt open cut.". Out of this little space was taken the enormous yield which has startled the world. We are pretty near through with our map now, but a few more details are necessary. Go to the southwest corner of the Eberhardt open cut; measure due south 35 feet, then due west 6 feet; make dot, mark "Defiance shaft." This was a little jumping arrangement, by which some outsiders sunk down and lifted $30,000 worth of ore before they could be be stopped. Easy way to raise a stake! From the Defiance shaft measure due south 55 feet, then due west 10 feet; dot, and mark "Blue Bell shaft." At last we have reached the south wall of this wonderful ledge. One hundred and ninety feet wide at this point. Now I will give you the location of the Gray Eagle and Richmond claims in a minute, and the map is done. Go to the Blue Bell shaft; measure 60 feet due east, thence south 10 feet, dot, and mark "West end of Richmond Tunnel." Go back to the Blue Bell shaft; measure due east 120 feet, dot, and mark "Initial Point of Richmond Tunnel." Connect the two extremities of the tunnel with a line and mark it "Richmond Tunnel." From the west end of Richmond Tunnel draw a line due north 6 feet; mark it "Connection Blue Bell Workings with Richmond Tunnel." From the north end of this last line draw a straight line westerly to Blue Bell shaft; mark it "Blue Bell connection with Richmond Workings." Go to the initial point of the Richmond tunnel; measure due north 40 feet, dot, and mark "Initial Point Gray Eagle Tunnel." Run the tunnel 40 feet parallel with the Richmond tunnel, and your map is finished. No: I forgot. I have not given you the south wall. Go to "initial point," Richmond tunnel; measure due south 24 feet; dot. Now take a ruler and draw a line westerly from this dot through the Blue Bell shaft, and in the same course to the left side of the paper. There's your south wall of the Eberhardt. You will see the ledge gets narrower as you go west. It has not been explored yet beyond the line of the Moffet shaft. If you want to know where shaft No. 1 is, drop a line due south from shaft No. 2, 51 feet, dot and you have it. Remember also that on the eastern side, about on a line with the east side of the Eberhardt open cut, the ground begins to slope rapidly to the east down to a canyon, and you will then see how it is that the Gray Eagle and Richmond tunnels were started.

THE LEGAL ASPECT OF THE CASE.

The following is a copy of the Eberhardt notice of location:

"NOTICE.—We the undersigned, claim 1,000 feet north, also 800 feet south, on this ledge, with all dips, spurs and angles. It shall be known as the Eberhardt ledge, White Pine District, January 3, 1868."

NORTH.

F. B. Eberhardt,	400	feet.
J. F. Cole,	200	"
F. Woodard,	200	"
S. Ammon,	200	"

SOUTH.

W. McCauley,	200	feet.
F. Drake,	200	"
J. W. Crawford,	200	"
E. A. Sproul,	200	"

The Blue Bell, Keystone and Gray Eagle were all located May 12, 1868; the Richmond not until June 19, 1868.

THE ERA OF COMPROMISE—THE KEYSTONE COMPROMISE.

As I have mentioned in former letters, the owners of the South Eberhardt were not the ones who first discovered the value of their location. It was the Keystone Company which first found the rich deposits of mineral in this section, on their ground just north of the Eberhardt open cut. But when they began to strike it so rich, the Eberhardt began to dig down by them in the space marked "Eberhardt open cut," and soon struck the same kind of ore, and began to take it out in enormous quantities. Whereupon the Keystone began to cry out that the Eberhardt was trespassing on its ground; referred them back to their initial point the Moffet shaft, 150 feet distant, reminded them that they (Eberhardt) had taken up their claim north and south, and hooted at the idea that the Eberhardt ledge could be wide enough to reach out to the center of the open Eberhardt cut. The Eberhardt retorted that the ore they are taking out of the cut was the same as that from the Moffet shaft; that the Keystone was the same; that it was all the same; that they, the Eberhardt, were there first, by over four months; that they could prove a connection of ore from the open cut to the Moffet shaft, their starting point, and would thereby take it all. But they were both badly scared. The Keystone feared that the Eberhardt would prove the connection, and the Eberhardt feared that before they would have time to do it the Keystone would get all the rich ore out; and so they compromised, and the Keystone took that part of the line on which are the shafts No. 2 and 3, and the Eberhardt the portion south; with an agreement, however, that if it proved that the Keystone and Eberhardt open cut connected, they would consolidate with a subsequent agreement that each might work independent of the other for a year.

THE BLUE BELL COMPROMISE.

By this time the marvelous yield from the Keystone and Eberhardt open cut set people wild. Every man who had a sign of mineral on his claim began to dig down with frantic energy, thinking he might be rewarded with the results, and those who were taken with the digging mania, and had no claims of their own to dig upon, restrained not their impulses, but valorously set to digging whenever they thought the show was good. One crowd, with a touch of humor in their lawlessness, organized under the name of the "Defiance Company," and in contempt of all law, sank their shaft before referred to just 35 feet southwest of the Eberhardt open cut, and also struck it rich and divided $30,000 between them for a starter. Then the Blue Bell men, just fifty-five feet south of the Defiance Company, began to sink on their little vein of ore. Soon it enlarged, with ore of the same kind, and fully as rich as the Keystone or Eberhardt, and at thirty feet deep it got quite large and turned and ran towards the Defiance. The Defiance workings showed a very probable connection with the Eberhardt open cut, but the Blue Bell was now running into the Defiance workings. Then came up the same question between the Blue Bell and the Eberhardt open cut as before had been raised by the Keystone. The Blue Bell was located the same day as the Keystone, and had the same claim to the vast body of ore in the Eberhardt open cut that the Keystone had. The Keystone had yielded its uncertain claim to the whole for a definite slice, and its claim was settled; but the Blue Bell made no compromise, and was in condition to assert its rights. The Eberhardt had been so busy working in its open cut, and deeming all difficulty settled by the Keystone compromise, that it had made no effort to prove its connection with the Moffet shaft, its initial point. It was in the same fix now with Blue Bell that it was before with the Keystone. It might take months to make its connection, and while doing it the Blue Bell might run into it and sweep the ore; and, besides, there was the terrible contingency that they might not be able to prove the connection, after all, and so the Blue Bell was admitted as a member of the family, on terms satisfactory to all concerned.

"Six Richmonds have I slain."—

"Scarcely had the Eberhardt family, now getting full large enough for comfort, fairly hob-nobbed with one another and got well acquainted, before another foe appeared to contest the field. You will remember four parties laid notices on this ground besides the Eberhardt, which last was not certain of its title, viz: the Keystone, Blue Bell and Grey Eagle, all on May 12th, 1868, and the Richmond on June 19th following. The Keystone and Blue Bell had put in their claims and got them handsomely allowed. In the natural order of things, it was now the Gray Eagle's turn, but there was something the matter with the noble bird. It may be it lacked trainers to put it in fighting trim, or that backers were scarce. Certain it was that it showed no signs of life or fight. While it thus lay, letting 'I dare not' wait upon 'I would,' in jumped young Richmond, 'full panoplied for the fight.'

THE DEFIANCE COMPROMISE.

"The owners of the Defiance Shaft had no hopes of holding any ground. All they were after was to get out and get away with all the ore they could. They were taking out about $3,000 a day. When the Eberhardt boys began to show a probable connection of their ore with the Defiance Shaft, the men working therein got alarmed, and offered to 'git' if the Eberhardt would let them take away what ore they had out. Assent was given to this, and the Defiance men went their way rejoicing.

THE CHE-HOC-TON COMPROMISE.

"A little east of the Defiance Shaft another company had jumped in and sunk the Che-hoc-ton Shaft. They had found no mineral yet, and gladly yielded possession on the payment to them by the Eberhard of the coast of sinking the shaft.

THE DAY OF COMPROMISE IS PAST AND THE LAWYERS GET A SHOW.

"The Richmond company went about the matter in a style that showed they meant business, '*Aut Cæsar aut nullus.*' The Eberhardt, learning wisdom at last, and having the benefit now of many heads instead of one, vigorously set about proving their connection with their initial point. They sunk shafts, run drifts, dug open cuts, tore the ground and laid everything bare until they proved a connection from the Moffet Shaft to the Eberhardt open cut. But their work was not half done yet.

"For the purpose of showing a vein they must prove a connection with the Keystone in order to get a sidewall. Some limestone 'horse' troubled them a little, but they got through. The next thing to do was to prove connection from the Eberhardt open cut to the Defiance Shaft. Here they struck a terrible knot in the form of a huge mass of calc spar about eight feet south from the open cut, that seemed to rise up and stretch across like a barrier between the two workings. Oh! the swearing that was done in Austin about that calc spur. Now it struck its roots down to the bowels of the earth, and reared its head to the sky and stretched east and west to the confines of the mountain range with no speck or particle of mineral in it, and then, when the other side came to talk, it dwindled down to a little insignificant nodule, imbeded in a mass of mineral; mineral around and about it, above and below it, in, through and upon it; mineral everywhere. Then they had to trace mineral into the Blue Bell tunnel. As these workings progressed, while they were bending all their energies to annihilate the Richmond, and beginning to feel confident of success, they were suddenly startled by a wild shriek from the Gray Eagle. Two keen, lynx-eyed lawyers, scenting the battle from afar, had suddenly appeared upon the scene, and casting an eye over the field, saw that if there was any chance of success the Grey Eagle was the bird to bet on, as it had an older claim than the Richmond. They quickly put the bird in fighting trim, sent for backers to Virginia, who came at the word duly heeled (with $100,000, some say), and everything was ready for the bird to fly. But the Richmond lawyers were argus-eyed. Though their main gaze was bent to the front, this attack to the rear had not passed unnoticed. They set the infernal jugglery of the law quietly to work, and on one fine morning when the trainers and backers of the Gray Eagle went to caress their bird, they found it laid out, sicker than a young chicken with the pip. An ugly looking little paper pellet stuck in its throat, and told a sad story of blasted hopes and unfingered fees. Well, the Eberhardt went on with its workings, and on the trial obtained an acknowledgment from the jury that their proof of connection from their initial point throughout was satisfactory, 'calc spar' and limestone 'horse' to the contrary notwithstanding. Verdict for the Eberhardt. Richmond moved for new trial. Appeal taken. There it stands, and I'm glad I'm through with it. The Eberhardt subsequently bought the Gray Eagle title, so that all they have to fear now is a reversal of their judgment against the Richmond, on which score they seem to give themselves no uneasiness. I would like to give you the history of Chloride Flat. Ah! there's a story for you! One would need the clue of Ariadne to find his way through the maze of locations piled twenty deep on one another, and when he got the straight of it this would be a very unhealthy latitude for him if he published half of what he knew. The air is very light here and is not very satisfactory as a breathing medium, but it is better than none, and I guess I'll let Chloride Flat alone."

California.

Nevada County.—From the *Gazette* of March 6, and earlier dates, we select the following:—"The monster casting for the Rivot works at Canada Hill arrived on Sacramento street last Monday forenoon, and turned off on the Gold Flat road for its final destination. It was hauled by means of a rope and tackle and ten yoke of cattle. About a hundred of our citizens turned out to see this mammoth creature of iron. It must be one of two things—either a wonderful success or an equally wonderful bilk. There can be no half-way work about it. We hope it will prove to be all its owners hope for....Luddington & Co. recently struck a stringer of the La Crosse ledge, which is situated in Rhode Island Ravine, and took out three loads of rock from which they realized $125. The rock was crushed at the mill of Philip Day, at Rough and Ready....We notice a fine specimen of copper ore at the Union Hotel, weighing about sixty pounds. It was recently brought up from the Well lead, near Spencerville. It is estimated to contain from twelve to fifteen per cent. of copper....Philip Dahle's mill at Rough and Ready was started up the last week in February. It is situated in the eastern end of the village, near the Bunker Hill ledge. It was built for the purpose of working this ledge, which is owned by Dahle & Ebelin, who are engaged in developing it. The ledge averages about eighteen inches in width, and the rock ranges form $9 to $30 per ton....A large slide occurred in the McCauley diggings, near Rough and Ready, during a late storm. Some two or three acres of ground, to the depth of eight or ten feet, slid off, carrying thirty or forty rods of the Squirrel Creek ditch. It also carried off the garden of Philip Dahle, and barely missed his house. ....The *National* says that great improvements have recently been made at Frank Morse's mine, in Grass Valley. The quartz has changed to a bluish color and looks very favorable. The sulphurets from the rock are worth $150 per ton. They are now down on the incline 150 feet, and have 175 loads of rock out ready for crushing. The last lot paid $51 per load, and that now on hand is of a still better quality....Among the new enterprises which promise success is mentioned the Garden City mine, located above the old Gold Hill mill on Wolf Creek, and owned by a San Francisco company. The ledge in this mine is about two feet in thickness, with beautiful walls, and shows some gold with heavy sulphurets. The miners are now engaged in raising the incline shaft to the surface. Gregory & Mansau, at Sebastopol Hill, are taking out some splendid rock, which good judges say will pay as high as $75 per ton. The ledge is not a very large one as yet, but has improved as the miners go down on it.... The Hope Gravel Company, located on Alta Hill, near this place, are still hard at work developing their mine. Recently a contract was let for sinking a shaft 200 feet, at a point 1,000 feet west of the old works, where the Company have been operating for three years past. William Paul & Co. took the contract for $9 per foot. The size of the shaft is 12 by 14 feet, divided into three compartments, two "hoistways" and a pump shaft. The shaft has been sunk 50 feet so far, and the work is being prosecuted with considerable energy. From the old shaft—1,000 feet east of the new one—the company have drifted to a point near the new shaft, which is being sunk to facilitate the development of the mine. The gravel bed is about 200 feet wide, running east and west, and the new shaft, when completed, will open up enough ground for at least two year's work....The Grass Valley *Union* of the 7th has the following: The prospect of an early start up of the Allison Ranch mine has a good effect on the town generally. Alfred E. Davis and M. Colbert seem determined to put the old place in shape. When the Ranch starts lively times may be expected in the southern part of the district. Gregory & Mansau, of Sebastopol Hill, have had a crushing. Thirty tons of their rock yielded them the sum of $2,500, which we call a healthy figure. The ledge, as they go down on it, is improving in thickness as well as in appearance. In the upper part of the county, about Graniteville, the miners are preparing for a brisk summer's work. A gentleman just from Eureka informs us that the snow is rapidly melting, only about two feet remaining now on the ground. Some of the opened mines have not stopped work during the winter, and when the snow goes off many new ledges will be prospected. The gravel mines of Underwood & Co., near Union Hill, have lately been paying very handsomely. The scarcity of water during the winter prevented work upon these claims, but now from twelve to fifteen dollars per day to the hand are realized....We find in the *Transcript* of Feb. 26: The prospect for a prosperous spring among miners in this county is excellent. The snow in the mountains will furnish abundance of water for many months, and our miners are generally satisfied that it is foolish to leave Nevada County, where the value of the mines is fully demonstrated, for any place of uncertain resources. The weather is now excellent, and if there is no more severe weather miners will be in the height of prosperity in a short time....According to the Grass Valley *National*, Feb 23, a contract has been let for sinking 100 feet on the Crescent ledge, Kate Hayes' Hill. Everything at the Sebastopol mill is moving along smoothly, with immense piles of rock in waiting to be reduced to a gold basis. Eighty loads from the Ben Franklin, near the Ione ledge, are now being put through. The last crushing paid as high as $40 per load. The company are down on their ledge 100 feet, and the rock is looking better than ever before, with the ledge ranging in thickness from 14 to 18 inches. From the Lamarque ledge, located on New York, 120 loads of Hill rock will also be crushed. The last crushing paid over $40 per load, and it is thought this ore will average $50 per load. We also saw an immense pile of rock from Gregory & Mansau's ledge, on Osborne Hill, to be put through the batteries. Some lively betting is going on as to how much it will pay per ton, but it is generally conceded that it will be in the vicinity of $100. Things certainly look very encouraging for a lively and prosperous mining season in Grass Valley; so much so, that many who had the White Pine fever are wisely concluding to stay at home and invest their coin where there is a chance of having a return for it....The *Transcript* of the 2d has the following additional in regard to the Rivot roasting furnace: The immense cast-iron cylinder intended for the revolving furnace for roasting sulphurets at Canada Hill, near this city, passed through town yesterday. The casting weighs 21,600 pounds, and is cylindrical in form. It is fourteen feet long, and the space intended for the furnace is ten feet in length, and five feet in diameter in the clear. The space has eight or ten triangular projections, which are intended to throw the sulphurets towards the center of the cylinder as it revolves. The casting is to be rigged on machinery, and at either end it will be closed. It is intended to revolve slowly, while the sulphurets are charged with superheated steam and roasted. The casting was brought from Colfax in six days on an ordinary truck, such as is used in the mountains for "logging." It was drawn by ten yoke of oxen, and in going up the grades, pulleys and ropes were used. It is estimated that the cost of transportation from Colfax to the works, a distance of fifteen miles, was from $1,000 to $1,500. The company for which the work was done is composed of French capitalists, who have been for more than a year putting up extensive works at Canada Hill for the purpose of treating sulphurets by the Rivet process. They have already expended in the neighborhood of $100,000, and it is said they have a capital of $500,000 to draw upon if necessary. They have a 140 horse-power engine, and a large amount of machinery, and those who know best claim that they can work sulphurets within four per cent. The directors claim that the experiments thus far warrant the construction of the immense roasting furnace for which the mammoth cylinder is intended, and in which they can treat from three to five tons at a charge.

North Carolina.

CABARRUS CO,, N. C., March 26, 1869.

EDITOR JOURNAL OF MINING:

SIR:—During the late war the only branches of business which retained any vigor in this region were those directly connected with fighting and eating. Gold mining was kept up for a time, but finally succumbed to the inexorable demand for men. It was among the first to shake off the paralysis, and has slowly but surely gathered strength to the present time.

This new impetus is largely the work of Californians, many of whom, unwilling to remove their households to more remote gold fields, came here to settle permanently, and devote the skill and means gained elsewhere to mining and *living* at one operation.

The result of this immigration is already apparent in the character of the new mills, hoisters and modes of mining. Barring an occasional "great improvement upon the old system," the mills lately erected are as good, perhaps better, than the average

in California. Indeed, a large proportion are built by Morey & Sperry, of New York, from late San Francisco patterns.

It is to be regretted that undue haste, or something worse, has influenced the location of many of these mills. Common report or evidence of former working were about all that remained upon which to base an estimate of the value of most of the old mines. These proofs have been too often accepted in place of necessary openings, and mills ordered in advance of their requirement, in advance, too, of any positive knowledge that they ever would be needed.

There seems to have been haste also in the selection of machinery best adapted to partition mines. Veins which vary in width from a few inches to several feet, in yield from five dollars to as many hundred per ton of ore, and whose general characteristics comprise all grades from free gold to dense sulphurets, and from the most pockety to the most continuous, surely go very far to prove that the question of adaptation should be thoroughly considered. There are several instances within my own knowledge in which the new apparatus is found to be far less efficient than that which was removed to make room for it. He must, indeed, have, enjoyed rare advantages, who, coming here from a widely different field, can afford to ignore all the fruits of native experience. Those will fully understand me who have been caught measuring the value of a Mexican miner by his appearance or information on general subjects. The "greaser" and his mule and arrastra are doubtless very imperfect models, but their joint agency is often highly suggestive. No gold miner, however great his research and experience, is quite level with his time until California has widened and rounded out his education. The history of that country for the last twenty years is one of ceaseless accretion from the gold fields of the world—of their best brains not less than their best methods and machinery. The competition thus afforded gave good results, to which the organizing and inventive talent of the country have added much that is new and valuable. It is doubtful if any difficulty will arise here which has not been met and mastered in California, but to suppose the benefit of all this aggregated experience to belong to any one man would scarcely follow. It is very certain, however, that the conditions which have so fostered and improved gold mining there might be transplanted to this field with great profit.

The question of adaptation is many-sided. In one instance, large capacity for crushing and pulverizing is the principal object. In another, the main feature is amalgamation. Copper plates are nearly or quite sufficient for the first, the other requires hard and persistent friction. One needs a large outlay for cars, tramways, and all the labor-saving and self-acting conveniences necessary to insure rapid and steady operating. In another, the owners should be chary of investment, and use the simplest means compatible with efficiency. Concentration can hardly be too thorough in some, others may dispense with it entirely. The same applies to the need of roasting, or, taking that for granted, to the choice of modes to be employed.

Perhaps no feature of this whole business is open to more generally adverse criticism than the relative attention given to mining and milling. Instead of the first care—and always the largest—mining is often left almost wholly in the background, while the mill absorbs and exhausts every energy in getting ready to treat the ore which is to be. And those tardy beginnings are often made with no matured plans, no real system, and no safe and far-reaching provision for future requirements; sometimes, indeed, with no adequate fund at command to carry them successfully through. Non-resident ownership is fruitful of this kind of trouble, for it is notorious that experience alone fits men to comprehend fully the labor, care and skill always required below ground.

Outside a few exceptional cases, large investments in the purchase or equipment of these mines are unwise and unnecessary. True, fancy prices are still asked, but there is no need of paying them. Looking further is all that is necessary. Large mills are seldom required as yet—if needed hereafter they can probably be obtained. Economy is needful, and entirely practicable, as will be seen by the following list of prices: Common labor, 60 to 80 cents per day without board; miners, $1 25 to $1 50; cord wood, delivered, 80 cents to $1 50 per cord; lumber $12 75 to $16 per thousand feet; woodland from $5 to $10 per acre, and other necessaries in proportion.

Heretofore most of our gold was obtained from ores in some stage of decomposition. This cannot long continue, and the sulphuret question must be squarely and practically met.

There is no doubt of the permanency of these fissure veins or of their geological correctness, but deeper levels must be reached and larger expenses incurred. Beyond doubt the gold is here in paying quantities, and the means are ample for its cheap extraction. Chlorination costs less here than does wet crushing in many places, and roasting in any form in which chemicals are not required is relatively cheaper still.

It is said that smelting works are soon to be erected at or near Charlotte, in this State, upon a plan now in successful operation in South Carolina. There is a large amount of ore in this belt, which will doubtless pay for smelting where fire-clay and the needful fluxes are accessible. Land titles are good, and generally in fee simple, although the mineral interest is sometimes sold, with the right of ingress, egress, wood, waters, ways, etc. This climate is eminently healthy, not too warm for vigorous work in summer, and has no hindering frost and snow in winter. It is difficult to conceive conditions more favorable to mining as a life business, or better calculated to place it among the regular, legitimate branches which enrich the locality where they are carried on, rather than a speculative robbery, which makes gold a curse to the country which produces it. H.

Arizona.

A correspondent of the San Francisco *Bulletin* writes as follows concerning the mineral resources of the districts along the Colorado.

THE SAN FRANCISCO DISTRICT.

To commence at Fort Monave, as for some distance below there, no silver mines have been discovered: Within ten miles of it, in the first range of mountains, known as the San Francisco District, a number of ledges have been located, some of which promise quite rich in silver, which, if they were anywhere else but in Arizona, would attract a good deal of attention, and much greater developments would have been made.

THE SACRAMENTO DISTRICT.

The next mines of any note are those of the Sacramento District, which is the second range of mountains from the Colorado river and about 30 miles east of Hardyville, seven miles above Fort Mohave. The mines of the Sacramento District are, with few exceptions, all argentiferous galena such as are called at White Pine, "base metal ores." There are such an abundance of mines containing this argentiferous galena (or base metal) that it is surprising so little has yet been done to develop them. It is an undeniable fact that all the ores carry as much silver with them per ton as do mines now profitably worked in and near Virginia City, Nevada. But to do the district, the mines and the holders of them no injustice, it must be stated that the Indians have so far disputed the right of the white men to work them. Within the last three years they have killed men at their work in the mines. At present the Indians are victorious, and the miner cannot venture near them. There is little chance there for a poor miner. It requires a large company, able to employ 20 men or more, which might be considered safe, as the military will afford some aid. Could this be done—safety of person be insured—I don't know of any other mining district, White Pine excepted, that promises so rich.

Supplies and everything necessary can be shipped to within 30 miles of the mines, and also all the lead and base metals can be made available by shipping down the Colorado river to San Francisco, where it can be profitably marketed. Taking everything as found at present, all the disadvantages combined, companies with means, say from $30,000 to $50,000, cannot fail, working with any system at all to be highly successful. Many valuable mines could not easily be obtained. If these base metal mines at White Pine can be worked profitably, the mines of the Sacramento district can be made trebly so, for they have the same kind of ores, and plenty of wood, water and grass, with a pleasant climate. They are also on a straight line with the White Pine country, which a glance at the map will at once show

AN UNDISCOVERED DISTRICT.

There is also a rich mining district northeast of the Sacramento District, but is as yet undeveloped, for it is not safe, nor has it been for years, for small parties to travel through that country. Before the Indians began to show hostility to the whites, they frequently brought pieces of silver ores to the miners then working in the Sacramento District, desiring them to go with them and they would show them the veins where they had broke the ore from, which they exhibited. There is no doubt if the state of the country permitted small parties to go wherever they pleased, rich developments would surely be made.

EL DORADO CANYON.

El Dorado Canyon (Colorado District) sixty miles above Fort Mohave, has a number of mines already developed, some of which have been and are now worked with profit. It cannot be said the mines are not rich enough, but the general rule of silver mining cannot be ignored here; it takes some capital to develope them although a good deal of work has been done there by the owners of the mines themselves. I could impress upon those proposing to prospect and mine near the Colorado river, to go well prepared, although living and everything else is much cheaper there now than it was a few years ago. Mining commenced in any of the above-mentioned districts can be turned to good results, if commenced with judgment and vigor. An idea was entertained by many, until recently, that men could go to Arizona and pick up the gold and silver; that it was there in such abundance that no outlays beforehand was needed. The consequence has been that many have paid dear for their move, and the effect of this infatuation still hangs over the whole country. CERBERT.

Idaho.

We learn from the Silver City *Avalanche*, March 6th, that "the south extension of the Silver Cord, lately incorporated in San Francisco, location on War Eagle Mountain, near the original mine of that name, is going to be worked. Mr. Jones, formerly of the Cosmos Mill, has been appointed superintendent for the new company, and has returned with instructions to prosecute the matter without delay. Mr. Jones has already let the contract for sinking a shaft to Pete Nick, who will bring his accustomed energy and promptness to the work, and we will soon be enabled to record more mineral disclosures....The shipments of bullion from Wells, Fargo & Co.'s office in Silver City during the month of February, amount in the aggregate to $91,645 76, coin rates, or $122,194 34, currency."....The same paper, March 20, has the following account of a mining difficulty. It says:—"The rich placers of Calaveras Flat appear at present to be a huge bone of contention. Work is suspended and the vicinity is in a state of siege. We have not visited the seat of war, but have been informed that fortifications are erected and strongly garrisoned, and it is extremely unhealthy to be 'lying around there loose.' A difference of opinion as to who has the best title, was the origin of the difficulty. The Henry Brothers, who have worked the claims for two or three seasons, are in possession, which, as the old proverb goes, is 'nine points.' Messrs. Curlew, Brown, Woodward and others contend that the Henrys have not complied with the mining laws, and have, therefore, forfeited their tenure. We know nothing of the merits of the matter, or which party has the better right, but we do know that there has been a great deal of powder consumed and very little execution done as yet. Several shots have been fired in the vicinity of the fortifications, and about 10 o'clock Monday night Slaughterhouse Gulch was made to reverberate with the bang and clatter of small arms, which we learn was altogether a one-sided affair, the shootists having been only experimenting with the evening breeze. Things continue to wear a belligerent aspect, and the Coroner's service may yet be required."....The following items are from the Idaho *World*, of March 11th:—"From Mr. Mesick, who has worked in the Elk Horn Mine and mill for several years, we learn that the company have already about 400 tons of good ore ready for crushing, which was taken out of the ledge this winter. The mill will commence crushing in a week or two. The quantity of snow on the mountain about the mill is not so large as was promised from weather indications a month ago, but yet good heads of water will be supplied to the ditches over on that side of the basin for a fair season of mining. Warm, melting weather continues at daytime, with slight frosts at night."

Canada.

MADOC GOLD DISTRICT.

The Belleville correspondent of the *Toronto Monetary Times* writes under date March 8th. "Very little progress has been made in mining operations for several weeks past; and such strict secresy has been observed in almost every quarter where work has been done, that I shall be obliged in some cases, however unwillingly, to give you current reports instead of authentic intelligence. The Richardson Company affect no reserve as to their doings; but from various causes they have not done much work of late. Mr. Dunstan, their manager, came down last week, bringing with him a "brick" of gold of the value of $260, the produce of about 50 tons of rock, or about $5.25 per ton. The Merchants' Union Company lately sent 3 tons of their vein-stone to be reduced at the Caldwell (Severn) Mill. The total result was gold to the value of $2; but if, as is reported, the mill is in a bad state of repair, this crushing may not be a true index of the value of their ore; indeed, both from inspection and experiment, I am inclined to think more favorably of their lode. The mill in question (Severn's) has been running night and day for some weeks upon quartz from the Fiegel mine, with very satisfactory results. The mill-owners have not let anything be known as to the actual amount realized, but $20 per ton is freely mentioned. The supply of ore from this source is, however, cut off, as Mr. Feigel intends to put up machinery to reduce his ore on his own account. This I give merely as a current. The proprietors of the Barry mine, in the Township of Elzevir, have been running their new machinery experimentally, with, it is said, "splendid results." As the shareholders have got their disputes settled, they will shortly commence to work commercially—also a common report. The Toronto and Whitby Company's mill at Bannockburn is now complete, and in working order; but I have not heard whether or not any crushing has been done there. The machinery for Mallorytown is well advanced. The boiler and other essential parts have been sent down, and the remainder of the apparatus is being got ready as quickly as possible. A company of gentlemen from Cincinnati are about to commence working a deposit of grey crystalline limestone, banded with plumbago, at Eagle Hill, in the Township of Denbigh, which has given good results by small assays. Some of the principal men in the Town of Belleville contemplate erecting a test mill to make assays of rock of 100 lbs. each, on the pan system of amalgamailon, under the management of Prof. Bell, of Albert College.

ZINC.

New Hampshire.

THE WARREN ZINC MINE.

A "down east" paper of recent date has the following account of the Warren Zinc mine, and the progress of its development. The writer incidently throws some light upon how certain sharp people in Warren disposed of their "valuable," mineral property:—"Most of our readers have heard of the existence of gold in more than one locality in New Hampshire, but as it is not unfrequently claimed for spots where there is none, many have disbelieved in its existence when it was really a fact. There is no longer any doubt, however, about the presence of gold at Lisbon and Warren. At the latter place the discovery of this precious metal is of comparatively recent date (at least in paying quantity), and it is claimed now to be a discovery of real consequence. It is found at what is known as "The Warren Zinc Mine," which has been worked for zinc, copper, silver and lead, at intervals, for more than twenty years.—From time to time great expenditure has been made, in the attempt to open and utilize these deposits, but upon the whole the profits have not repaid the investment. It is now worked for zinc alone by a New York Company, and the operations are conducted by Capt. Edgar, an experienced Cornwall miner. This is a most remarkable mine for the great variety of minerals found. At the point of excavation, and in the immediate neighborhood, the following minerals are found: Gold, silver, copper, lead, zinc, iron, antimony, nickel, arsenic, cadmium, scapolite, tremolite, talc, tourmaline, beryl, apatite, molybdenum, garnet, plumbago, idocrase, epidote, calc-spar, brown hematite, hyalite, cinnamon stone, quartz crystals in great variety, beside others of less importance and all the rocks common to New Hampshire. It is already known that forty-one different mineral specimens are to be found in that neighborhood; but not content with this, several enthusiastic mineralogists aver that tin, platinum, and rough diamond also abound—although as yet they fail to produce the samples. This remarkable mine—this wonderful natural cabinet collection of minerals—is located upon what is known as Sentinel Mountain, in the southwest corner of the town, and it is reasonably safe to say that no spot on earth contains a greater variety of metals in so limited an area. In addition to legitimate mining, many persons are engaged in the collection and sale of mineral specimens, several hundred dollars' worth being disposed of each season. The business has been industriously prosecuted, and is made a source of considerable revenue to Mr. James Clement and others. Some five years ago a party of tourists from New York visited Moosehillock Mountain. There they fell in with a "spiritualist," who went into a fit, and looking with shut eyes toward Sentinel Mountain, saw there fourteen different and distinct minerals in a mine described as located at a certain clump of spruces. The oracle was believed, a company was organized, and they actually worked a year and a half at the spot indicated. They indeed found iron and some other minerals, but nothing that would pay, and the undertaking was abandoned after a useless expenditure of from five to six thousand dollars. In this transaction our readers will agree that each individual concerned was not many degrees removed from a "darn fool." Another individual—probably a cousin to the tourists—paid $1000 for a worthless piece of land, upon which some "specimens" had been deposited. It was a regular salted claim, and the buyer was out and injured to the extent of his investment. Some sharp people in Warren. At the zinc mine now being operated, the main shaft is a little over a hundred feet deep, and a lateral drift has been driven into the side of the hill some two hundred feet. At the terminus of the horizontal lead, a large chamber has been excavated, and taken altogether it is the most extensive underground affair in the State. It is visited by great numbers of people. The mine is pumped and the ore raised by a powerful steam engine. After being taken from the mine the ore is put in a kiln and desulphurized by heat. This is done to save weight in frieght, as from every thirty tons of ore about ten tons of sulphur are expelled. Hitherto the sulphur has been wasted, but means are now being employed to save it. This article has lately experienced a sharp advance in price, owing to the late terrible earthquakes in South America, by which the works in the greatest sulphur-producing districts of this continent were destroyed. It is now worth sixty dollars per ton. Capt. Edgar, the present superintendent of the mine, has had charge of the works for five or six years. He now employs from fifteen to twenty hands, and it is claimed that the operations are being conducted upon a paying basis."

Gold in Alaska.

Alaska appears to be rich in precious metals. Immense discoveries of gold have been made on the main land, 120 miles from Codiack Island, in latitude 61 north, longitude 150 west from Greenwich. Three several discoveries have been made—the first on Kuak river and Cheigmet Mountains; the second about 60 miles above Sitka, and the third on the island, name unknown. On account of the climate, the mines can only be worked five months in the year. Fine specimens of gold dust and quartz and nugget gold had been exhibited in San Francisco by parties from the mines, who were to return immediately upon obtaining outfits.

The East River Bridge.

By direction of the Secretary of War, a commission of United States engineers, consisting of General H. G. Wright, Gen. John Newton aad Major W. R. King, convened in this city, Wednesday, to examine the subject of the East River Bridge. The meeting was held with closed doors, but it was understood that the board would take no definite action upon the subject that day, further than to examine the various plans submitted to their inspection.

MARKET REVIEW.

Friday Evening, April 9, 1869.

Mining Stocks.—The market in Gold and Silver Stocks shows more activity. Sales of Smith & Parmelee are reported at $2 57; Consolidated Gregory, at $2 70, and La Crosse, 19@20c. The following is the list of the Board of Brokers:

GOLD STOCKS.

	Bid.	Asked.		Bid	Asked.
Consolidated Gregory	2 70	2 75	Montana Gold	31	..
Grass Valley	1 10	1 20	Quartz Hill	1 05	1 10
La Crosse Gold	17	20	Smith & Parmlee Gold	2 50	2 55
Mariposa	....	19¼	N. Y. & Eldorado	41	45
Mariposa preferred	34¼	35	Eagle Gold		

SILVER STOCKS.

Combination Silver	4 25	....	Quicksilver	22	22¼
Owyhee Mining		20 00	Atlantic and Pacific		

COPPER STOCES.

Central		31 00	Davidson	25	58

LEAD STOCKS.

Walkill	25	47	Wallkill assented	45	47

COAL STOCKS.

Cumberland	32	36

PETROLEUM STOCKS.

	Bid.	Asked.		Bid.	Asked.
Bennehoff Run	44	50	Rynd Farm	10	..
Brevoort	....	....	United Pet. Farms	15	20
Buchanan Farm	55	60	Union	....	....
Central	65	70	United States	1 30	1 50
Clinton Oil	....	....	Sherman & Barnsdale	..	..
National	....	3 25	Second National	..	..
N. Y. and Alleghany	50	1 00	Bliven	..	..
Pithole Creek	1 25	1 45	Rathbone	..	..
Home Petroleum	4 80	5 30	Northern Light	..	..
Pacific Oil	..	....	Bergen Coal and Oil	.	..

MISCELLANEOUS.

Rutland Marble	$20 00

Miscellaneous Stocks.—West. Un. T., 41¼; Amer. Un. Ex., 40; Mariposa Min., 18¼@19; Pacific Mail, 92¼; N. Y. Central Railroad, bet. call, b30, 165; Huson River, 147@148½; Harlem Railroad, 137; Reading, 93@93¾; Mich. Central Railroad, 120; Mich. S. & N. I., 98; Mil. & St. Paul, 77½@77¾; Mil. & St. P. Pf., 85½@86; D. L. & W. Railroad, 114¾; Stonington Railroad, 83; Tol. W. & W., 68½@69; Fort Wayne, 131½; H. & St. Joseph Railroad Pf., bet. call, 113; D. & Sioux C., 116; Lake Shore, 98; H. & St. Jos., 114½; Chicago, Burlington & Quincy Railroad, 172.

State, R. R. and Other Bonds.—Jer. C. W. L., 93; Tenn. St. 6s, new, 64½@65½; Va. 6's, new, 58½; Nor. Car. 6's, 60; N. Y. S. 5's, '74, 100½; N. Y. C. 6's, '83, 90; N. Y. C. 6's, '87, 90; Mich. Southern S. F. Bds, 99½; C. & N. W. Con. con. conv'e., 97; Del. L. & W. 2d m., 92; Tol. & W. Con. con'e. bds., 80; C. & R. I. & P. P. R. 7's, 93½; Mar. Trustee 10's Ctfs., 6q; M. & E. 2d., 90; Col. C. & Ind. Cent. 1st., 82½.

Government Bonds.—United States bonds continue firm, in sympathy with the easier condition of the money market, and the "short" interest on some of the issues. Quotations range:

U. S. 6s, 1881, coupon	116 @116½	U S 5-20s, '65, new coup.	113¾ 113¾
U. S. 5-20s, 1862, coupon	119½ 120	U. S. 5-20s, 1867, coupon.	113¾ 113¾
U. S. 5-20s, 1864, coupon	114¾ 115	U. S. 5-20s, 1868, coupon.	113¾ 112¾
U. S. 5-20s, 1865, coupon	116¼ 116¾	U. S. 10-40s, ex. coupon	105½ 105¾
Pacific R. R. 6 per ct. bds.	103½ 103¾		

Foreign Exchange.—Foreign exchange is quiet and steady. We quote:

Lon. (pr. bks), 60 dys	108 @ 108¼	Swiss	5.25 5.21¼
Lon. (pr. bks'), sight	108¾ 108¾	Hamburg	35¼ 35¼
London, prime com	107¼ 107¾	Amsterdam (bankers')	40¼ 40¼
Paris (bankers'), long	5.22½ 5.21¼	Frankfort (bankers')	40¼ 40¼
Paris (bankers'), short	5.20 5.18¾	Bremen (bankers')	78 78¼
Antwerp	5.25 5.21¼	Berlin (bankers')	70¼ 71

Gold is firm and with more speculative movement, the price having ranged at 132¾@132¾. Loans have ranged from 10 per cent. per annum to 5 64 per cent, p.a. day "for borrowing."

The money market continues to gain in ease. On the street rates have been, on stocks mostly, 7 per cent. in gold, and on United States bonds 7 per cent. in currency to 7 per cent. in gold. After noon there was rather more activity in the demand, and 1-32@1-16 per cent. commission added to the legal rate was asked, the advance in stocks having apparently produced an impression that the wants of borrowers must be correspondingly increased.

Petroleum.—The market is quite steadily held, with some little inquiry in part for export. Crude, in bulk, 17c.; standard white, 32c. The sales are 1,000 bbls., at 31c.; 1,500 bbls. for May, June and July at 34½c. For Philadelphia delivery, 500 bbls. standard white, for the balance of the month, at 31c.; 500 bbls. do., at 31½c., and 15,000 for May, at 33c.

Receipts for the week ending April 6	pkgs	8133
Exports for the week ending Arril 6	galls.	1,039,348
Exports from Jan. 1	galls.	11,776,874
Exports same time last year	galls.	10,721,770

The following is the quantity exported from other ports, Jan. 1 to April 3.

		1869.	1869.
From Boston	galls.	698,022	584,589
Philadelphia		3,925,734	5,628,123
Baltimore		261,055	290,869
Portland		....	6,800
Cleveland		....	....
Total		4,884,811	6,510,381
Total exports from the United States		16,771,606	17,638,289
Same time in 1867			11,697,260
Same time in 1866			12,698,483

Copper has declined to 23c. for Baltimore, and 23¼c. for Lake, with sales of 800,000 pounds for immediate delivery, and 300,000 pounds for end of May at 23¼c. At the close the pressure to sell is less, but there are few buyers, as it is believed 120 large parcels, under advances, will have to be sold.

The London market is dull at £71 for Chill Bars.

Tin.—Sales of 1,500 slabs, Straits, to arrive, at 32½c@34c., gold; on the spot, 600 slabs at 33¼c.@44¼c., gold; 250 slabs, Banca, 35 of jobbing lots, 35¼c.; 30 tons, English, 34½@32c., gold.

The English market advanced to £138 for Straits, and declined to £134 yesterday.

Spelter is dull at 6¼c., gold, for Silesian.

Lead.—Dull at 6½ to 630s. for ordinary foreign.

Zinc.—The price for White Oxide, foreign, is 11½ to 11¾c.; do., American 7½ to 8c.; Sheet Zinc, 12½ to 13c.

Lime—Rockland continues in fair demand at $1 25 for Common and $2, for Lump.

THE IRON TRADE.

Friday Evening, April 9, 1869.

The market for American Iron remains flat, with no business doing. We note sales of 100 tons G. F. on private terms.

Scotch remains quiet, and with but little inquiry. We note sale of 60 tons Glengarnock at $41, forced. All the sales of the week will not be over 300 tons at $42 for Glengarnock.

Old Rails—No sales.

Scrap Iron is quiet, with sales 200 tons from yard on private terms.

Bar from store continues very dull, at our quotations, and invoices are not saleable. American Refined is held at $87 50 in Philadelphia, but jobbers can only obtain $92 50 in lots from store.

Boston, April 3, 1869.

The *Commercial Bulletin* says, "The market for Pig Iron is firm and unchanged. The demand from consumers is quite moderate for the season, and in the wholesale trade buyers and sellers are rather apart in their views.

"Scotch metal is in small stock, and, with no invoices near at hand, dealers are realizing very full rates for the choice brands, which are offering in small lots from store only. American Iron is in fair supply, and the inferior grades are selling at relatively low rates. No. 1 is generally sold ahead, to fill contracts, and comes forward from shipping points slowly.

"Manufactured iron, of all seasonable descriptions, is in steadily improved demand; but bar and sheet are dull and a shade easier.

Scotch Pig is scarce, with small sales of Gartsherrie and other brands No. 1 in lots for consumption, at $43@$46 ₱ ton, the outside rate for Coltness. American is in moderate demand, with sales of retail lots at $41@$46 50 ₱ ton, for the different numbers. Charcoal Pig is selling at $50@$60 ₱ ton, as to brand. Bar Iron is dull and declining, with sales of English and American, from store, at $87 50@$90 ₱ ton for common, and $92 50@$95 for refined. Rails are firm and in steady demand, with sales at $55@$56 ₱ ton, gold, for English, and $81@$82 ₱ ton, currency, for American. Cast Steel is selling at 18@23c. ₱ ℔ for English, and 21@23c. for American. Anchors are selling at 8@8¼c. ₱ ℔; Chain Cables, (⅜@2 inches thick), 8@7¾c. ₱ ℔; Coil Chains, (⅜@1½ inches thick), 12@8¼c. ₱ ℔. Boiler Plates are selling at 7¾c. for flanges, 5¼c. for C No. 1, and 5½c. ₱ ℔ for common and tank. Russia Sheet is in very moderate demand, with sales at 11½@13½c., gold, as to number. English and American do. is quiet and selling at 5½@9c. ₱ ℔. Nails are quiet and firm, with sales at 5c. ₱ ℔ for assorted sizes. Old Iron is scarce and firm, at $1 50@$1 75 ₱ 100 ℔s for Cast, and $2 05@2 10 for Wrought Scrap."

The London Colliery *Guardian*, of March 12, reviewing the English railway iron export trade for 1868, uses the following language concerning this country:—"As for the United States, the industrial greatness in store for that enormous Republic seems well nigh boundless, if peace and good government can but be assured. It is the conviction of this future greatness which makes Americans so tenacious of the principle of union. The Union, they feel, must be maintained at all hazards, for they well know that if it is maintained, they must, in all human probability, become the most populous and the most powerful nation in the world. Stupendous as have been the strides made by the United States in former years, it seems likely enough that their progress during the next two or three decades will be yet more rapid. The population of the Republic is now about 40,000,000; but it appears likely to increase during the next thirty years—by the excess of births over deaths and by immigration from Europe—at the average rate of 1,000,000 per annum. By the end of the century at the most moderate computation, the United States will have then a population of 70,000,000, and, thrown into an enormous space, it is clear that 70,000,000 of the most energetic members of the human family will have built up by the year 1900 such a network of iron ways as is at present almost beyond our powers to conceive. The American Republic has great stores of iron and coal wealth, but for many years to come the impatient prosecution of American railways will necessitate large appeals to us for our railway iron."

According to the same paper, the exports of English railway iron since 1855 have been as follows:

Year.	Quantity—Tons.	Value—£.
1856	461,870	4,095,309
1857	457,560	4,000,515
1858	433,250	3,565,224
1859	528,927	4,124,208
1860	453,445	3,408,759
1861	377,565	2,906,359
1862	400,763	2,817,877
1863	446,440	3,278,804
1864	408,215	3,305,086
1865	434,300	3,550,563
1866	498,021	4,183,198
1867	580,571	4,861,129
1868	581,099	4,646,156

Market Prices.

New York, April 9, 1869.

Duty.—Bars, 1 to 1¼c. per lb.; railroad, 60c. per 100 lbs.; boiler and plate: 1¼c. per lb.; sheet, band, hoop and scroll, 1¼ to 1¼c. per lb.; pig, $9 per ton, polished sheet, 3c. per lb. Payable in gold.

Am. pig, fy. No 1, best,	$40 00@42 00	Bar, Swedes, ord'y sizes	— — 140 00
" " 2x frdy,	38 00 40 0	Bar, Eng. and Am., rf'd.	92 50
" Grey Forge	36 00 38 00	Bar, Eng. & Am., com.	85 00 87 50
White and Mottled	32 00 35 00	Scroll	120 00 150 00
Pure white for Cal. mar.	32 50 — —	Ovals and half round	117 50 142 00
Scotch Pig, No. I, best bd	40 00 43 00	Band	117 50 — —
" " outside,	40 00 — —	Horse Shoe	117 50 — —
Wt. No. 1Scrap f'm yd.	47 50 50 00	Rods, ⅜@3-16 inch	97 00 155 00
Ex ship	45 00	Hoop	125 00 180 00
Bar, Ref., En. & Am.	85 00 90 00	Nail Rod, per lb	8¼ 9¼
Bar, Sw's, as. sizes, gold	82 50 87 50	Sheet, Rus. as'd. Nos. (gold)	11¼ 13
Old Rails	47 50	Sheet, s'gle. D & T. com	5¼ 7
R.R. Iron, For., fm Stock gold	54 50 55 50	Rails, Eng., gold, ton.	55 00 56 00
R. R. Iron For., to imp.	55 00 00 00	Rails, American at w'ks	74 00 76 00
" " Amer. at wks. currency	75 00 76 —	STEEL.	
R. R. Iron, Am., deliv'd	78 00 80 00	English, cast 2d & 1st qual.	18 @22
Stt rails of any pattern at works, currency	....	Eng. Spring 2d & 1st qual	9 11¼
Solid Steel rls. For., gd.	95 — — —	Eng. Blister 2d & 1st qual.	11¼ 19
Street Rails at works	85 00 — —	English Machinery	12¼ 15
Light rls. for mines &c. at works	$85 00@— —	Eng German 2d & 3d qual.	14 16
Do. delivered here	.... — —	Am. Blister, "Black Diam'd,"	10¼ 16
		American, Cast, Tool "	19 —
		American, Spring "	10 13
		American Machinery "	— 13
		American German "	10 13

Lehigh Valley Iron Trade.

Pig Iron transported by the Lehigh Valley Railroad Co. for the week ending March 20, 1869:

From	Tons.	Total.
Carbon Iron do	225	10,050
Lehigh Valley Iron Co	300	12,450
Thomas Iron do	1105	41,190
Lehigh Crane Iron do	1090	36,770
Allentown Iron do	515	37,575
Robert Iron do	170	12,105
Glendon Iron do	685	30,114
Other Shippers	680	25,525
Total	4,770	205,779

For the week ending April 3, 1869:

Carbon Iron Co	250	10,300
Lehigh Valley Iron Co	190	12,640
Thomas Iron Co	710	41,900
Lehigh Crane Iron Co	990	37,760
Allentown Iron Co	720	38,295
Robert Iron Co	200	12,305
Glendon Iron Co	975	31,989
Bethl'm Iron Co	140	140
Other Shippers	855	26,380
Total	5,030	210,809

THE COAL TRADE.

New York, April 9, 1869.

Wholesale.—No new feature has marked the trade during the past week. There has been a good demand, but very few orders have been filled. Dealers bear in mind the uncertainty as to when the miners will inaugurate their proposed strike, and refuse to sell any coal except on terms which exhonerate them from delivery in case of strike, or such part of an order as they may be able to fill. Stated prices for April are freely given, but the uncertainty of the buyer receiving any coal upon his order makes them of little value. It is believed that the miners will go out (strike) about the 18th inst.

Retail—Trade has been very good during the past week. Many families having heard of the impending advance in prices are laying in their winter store.

Freights.—Vessels are in plentiful supply, and we have Boston quoted as low as $1 50. Trade generally in commercial circles being dull, throws an unusual number of vessels on the market.

The following will show the exports of coal from the port of New York for the week ending April 6, and for the season to that date, also the amount exported last year for the same period.

Exports for the week	tons	1,804
Do. from January 1	do	17,070
Do. same time last year		12,785

Philadelphia, April 8, 1869.

The anthracite coal trade, says the *Ledger*, was off a little last week as compared with corresponding week last year. The Reading Railroad brought down 83,085 tons, and the Schuylkill Navigation 15,272 tons, making by the two lines 99,157 tons, and for the season 912,201, against 793,324 for the same time last year, showing an increase from the Schuylkill region of 115,677 tons. The total tonnage of all the principal carrying companies for the week was 191,898 tons, against 183,191 tons in corresponding week last year, and 2,447,178 tons for the season, against 1,999,719 tons to the same time last year, showing an increase of 447,460 tons. There is a rather firmer feeling in the market, under a rather better demand for coal. The shipments from Port Richmond have increased, and vessels for carrying coal East are already becoming scarce. Contracts for the future delivery of coal are restrained by the fear of strikes, and by the belief of coal producers that coal is not likely to go below the present prices. Under these influences sellers of coal hold out of the market. We understand the Reading Railroad have increased their drawbacks twenty cents per ton on coal going East; but they are still fifteen cents per ton higher than they were last year. The Schuylkill Navigation Company have also increased the drawbacks on coal shipped east of New Brunwick, from 25 to 40 cents. The rates of transportation from the Lehigh have not yet been promulgated, so far as we can learn.

Boston, April 3, 1869.

The market is steady, with a fair reasonable demand for consumption. English Cannel is selling in large and small lots at $18@$20 per ton. Picton and Sidney are nominal at $8 25@$8 75 per ton by the cargo. Cumberland is selling at $9@$9 25 per ton. Antharcite is a shade firmer, with stocks considerably reduced, and a better feeling in the supply market. Cargo prices are nominal at $7 75@$8 per ton. The article is still selling by retail at $8 50 @$9 per ton, as to size and quality.

Philadelphia, April 9, 1869.

Trade is quite active. Most of the special coals are well sold up for April. No contracts are being made here for deliveries after April, except at market prices when shipped. The impression that a strike will occur on the 5th of next month, or the second Saturday in the month, is stimulating trade generally. Freights remain unchanged. Vessels are scarce,

The following table exhibits the amount of Coal that was passed over the various routes of transportation from the Pennsylvania Coal districts for the week ending April 3, 1869, and for the season to that date. A comparison is also made with the amount transported the corresponding week in 1868, showing the increase or decrease, as the case may be:

	1868.		1869.		INC. OR DEC.	
COMPANIES.	WEEK.	TOTAL.	WEEK.	TOTAL.	WEEK.	YEAR.
Phil. & Read. R. R.	64,942	728,499	74,250	746,966	9,308	18,467
Schuylkill Canal	....	....	15,572	40,644	....	....
Lehigh Valley R. R	51,824	647,339	48,104	707,110	d 3,720	59,770
Lehigh & Sus. R. R	10,392	84,235	22,853	230,579	d 12,462	d 146,343
*Lehigh Canal	....	....	....	....	....	....
Scranton North	6,334	96,209	10,798	128,665	4,464	32,546
Scranton South	16,516	257,430	30,776	384,789	14,260	127,359
Penn. Coal Co. rail.	19,599	147,473	18,059	178,791	1,540	31,318
*Penn. Coal Co. can.	....	....	....	....	....	....
*Del. & Hud'n Can.	....	....	....	....	....	....
Shamokin	9,089	87,913	3,869	79,731	d 5,220	d 8,182
Trevorton	446	4,413	125	5,035	d 321	d 632
Short Mountain	1,825	12,685	2,169	13,210	343	344
Lykens Valley Co.	1,936	21,790	1,102	10,925	d 834	d 10,864
Hunt'g'n & B'd T'p	5,148	41,709	5,764	74,650	616	32,941
*Wyoming South	....	....	....	....	....	....
*Wyoming North	....	....	....	....	....	....
Williamstown Col.	2,706	31,355	4,844	38,825	2,137	7,469
Total	190,757	2,161,280	238,285	2,639,920		
1868			190,757	2,161,280		
			48,528	478,690		

*Closed.

Lehigh Canal Coal Trade.

Shipped for the week ending April 3, 1869.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
MAUCH CHUNK.		
Lehigh Coal & N. Co.	....	....
Summit Mines	2,180 01	2,080 01
Room Run Mines	.. ..	....
Total Mauch Chunk	2,180 01	2,180 01
BEAVER MEADOW REGION.		
W. T. Carter & Co	193 09	193 09
Spring Mountain Coal Co	193 10	193 10
Thomas Hull & Co	934 18	934 18
Honey Brook Coal Co	131 01	131 01
German Pa. Coal Co	88 00	88 00
Other Shippers		
Total Beaver Meadow Region	1,540 18	1,540 18
MAHANOY REGION.		
McNeal Coal & Iron Co	....	....
Knickerbocker Anthracite Coal Co	....	....
North Mahanoy Mines	....	....
Delano Mines	....	....
Primrose Mines	....	....
Walter Brothers & Co	....	....
Mount Etna Coal Co	....	....
Trenton Coal Co	....	....
Thomas Coal Co	....	....
Williams & Herring	....	....
New Boston Coal Co	....	....
Copley Coal Co	....	....
Mount Carmel	....	....
Other Shippers	....	....
Total Mahanoy Region		
HAZLETON REGION.		
A. Pardee & Co	....	1,929 01
G. B. Markle & Co	....	....
Wm. S. Halsey & Co	....	....
B. Mountain Coal Co	....	....
Sharpe, Weiss & Co	....	....
Coxe Brothers & Co	....	....
Ebervale Coal Co	292 01	292 01
Stout Coal Co	....	....
Harleigh Coal Co	....	....
Asburton Coal Co	....	....
Highland Coal Co	....	....
Jeddo Coal Co	....	....
Pardee Brother & Co	....	....
Mount Hall	....	....
Woodside	189 17	189 17
Latimer	....	....
Sugarloaf	....	....
Other Shippers	93 17	93 17
Total Hazleton Region	2,504 16	2,504 16
UPPER LEHIGH REGION.		
Upper Lehigh Coal Co		
WYOMING REGION.		
Newport Coal Co	....	....
Valley Coal Co	....	....
Warrior Run Manufacturing Co	....	....
Parrish & Thomas	....	....
New Jersey Coal Co	....	....
Preston Colliery	....	....
L. & Susquehanna Coal Co	....	....
Germania Coal Co	....	....
Franklin Coal Co	....	....
Audnr'd Im't Coal Co	....	....
W. Barre Coal & Iron Co	677 12	677 12
Union Coal Co	....	....
B. H. Hillman & Son	....	....
Wyng C'l & Trns Co	....	....
Mineral Spring Coal Co	....	....
Henry Colliery	564 04	564 04
Everhart Coal Co	....	....
East Boston Coal Co	91 14	91 14
John Horton	....	....
Enterprise	....	....
Shawnee	471 15	471 15
Harvey Brothers	....	....
Consumers Coal Co	....	....
Delaware & Hudson Canal Co	....	....
Chauncy	197 18	197 18
Morgan Shaft	....	....
Berkley, Price & Co	....	....
Other Shippers	89 04	89 04
Total Wyoming Region	2,092 07	2,092 07

WHERE FROM.	TONS. CWT.	TONS. CWT.
Mauch Chunk Region	2,180 01	2,180 01
Beaver Meadow Region	1,540 18	1,540 17
Mahanoy Region	....	....
Hazleton Region	2,504 16	2,504 16
Upper Lehigh Region	....	....
Wyoming Region	2,092 07	2,092 07
Total	8,318 02	8,318 02
Corresponding week last year	....	....
Increase	8,318 02	8,318 02
Decrease	....	....

Report of Coal Transported over Lehigh Valley Railroad

For the week ending April 7th, 1869, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.	PREVIOUSLY Tons. Cwt.
Total Mahanoy	5,725 18	65,193 12	59,467 14
Total B. Meadow	10,540 14	108,490 07	97,909 13
Total M. Chunk		32 03	32 03
Total U. Lehigh	206 13	6,221 16	6,014 18
Total Hazleton	22,915 13	372,589 08	349,673 15
Total Wyoming	4,757 02	139,455 07	134,698 04
Total	44,146 06	691,982 13	647,836 07
To L. & S. R., at Penn Haven for r'l.		4,174 00	4,174 00
Do. for Canal	2,504 16	6,689 02	4,184 06
At Mauch Chunk for canal	1,454 18	3,712 05	2,259 07
Total Anthracite	48,104 00	706,558 00	658,454 00
Susquehanna region Bit. Coal, F. C'k.		552 03	552 03
Total by rail and canal	48,104 00	707,110 03	659,006 03
Same time last year	51,824 19	647,339 08	595,514 09
Increase		59,770 15	63,491 14
Decrease	3,720 19		....

Forwarded east from M. Chunk by r'l	42,729 09	666,691 10	623,962 01
Same time last year	50,280 11	637,740 06	587,189 15
Increase		29,221 04	36,772 06
Decrease	7,551 02	....	....
RECAPITULATION.			
Forwarded east from M. Chunk by r'l	42,729 09	666,691 10	623,962 01
Delivered at Mauch Chunk	15 13	510 11	494 18
Del. on line of r'd above M. C'k	138 07	3,867 01	3,728 13
Del. ab. M. C. for use of L. V. railr'd.	1008 13	17,409 12	16,400 19
To L. & S. r'd at Penn Haven for rail		4,174 00	4,174 00
Do. for shipm't by canal	2,504 16	6,689 02	4,184 06
At Packerton	73 19	2,012 10	1,932 16
At M. Chunk for shipmen. by canal	1,452 18	3,712 05	2,259 07
To N. C. R. R., at Mt. Carmel	174 10	2,043 12	1,869 02
Total	48,104 00	707,110 03	659,006 03

Lehigh and Susquenanna Railroad.

Report of Coal shipped for week ending April 3, 1869.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt
Total Mauch Chunk Region	3,880 04	53,425 03
" Hazleton	2,596 14	4,320 00
" Upper Lehigh	2,899 00	39,300 16
" Wyoming	13,476 13	132,925 05
Grand Total	22,852 10	230,579 04
Corresponding week last year	10,392 05	84,235 17
Increase	12,460 16	146,343 07
Decrease	....	....
Forwarded South from Mauch Chunk by Rail	16,096 09	204,205 16
Delivered on line of L. & S. R. R. ab've M'ch C'k	749 02	8,996 15
Delivered to Lackawanna & Bloomington Railroad at Plymouth Bridge	1,384 02	17,855 14
Delivered to L. V. R. R. Co, at Sugar Notch	25 15	4,923 16
Delivered at Coal Port for shipment by canal	4,597 03	4,597 03
Total	22,852 10	230,579 00

Schuylkill Coal Trade.

BY RAILROAD AND CANAL, FOR WEEK ENDING, APRIL 8.

	RAILROAD.	CANAL
St. Clair	30,238	....
Port Carbon	9,378	9,869
Pottsville	2,873	358
Schuylkill Haven	27,913	15,765
Auburn	1,706	....
Port Clinton	10,472	529
Company's use	4,536	....
Total for week	87,116	26,521
Previously this year	746,966	40,644
Total	833,072	66,165
Same time last year	783,345	60,149
Increase	49,727	6,061

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

At New York, April 8, 1869.

Schuylkill R. A., choice	$ 6 00	$....	Schuylkill Chestnut	$....	5 00
" Ordinary	5 75	....	Lehigh W. A. Lump	6 00	....
" W. A. Lump	....	5 25	" Broken	5 35	....
" Steamboat	....	5 25	" Egg	5 35	....
" Broken	5 50	....	" Stove	5 65	....
" Egg	5 50	....	" Chestnut	5 15	....
" Stove	....	5 75	Shamokin	....	5 00

SPECIAL COALS.—DEALERS' QUOTATIONS.

Diam'd Vein R.A., Sch'kill	....	6 00	Old Co.'s W. A. Lehigh	....	....
Locust Dale W. A., "	5 75	....	Mt. Pleasant	5 50	....
Honey Brook " Lehigh	6 00	5 15	Buck Mountain	5 50	....
Harleigh " "	6 00	5 15	Fulton	6 00	5 15
Spring M'n " "	6 00	5 15	Stout	6 00	5 15
Sugar Creek " "	6 00	5 15	New England Red Ash	....	....
Sugar Loaf " "	6 00	5 15	Wyoming	5 50	....

Dealers in these Coals may be found in our advertising columns.

At Philadelphia, April 8, 1869.

Lehigh L'p and St'mb't	6 00		" Egg and Stove		
" Broken and Egg	6 00		" Chestnut		
" Stove	6 25		Locust Mount Lump	4 00	4 25
" Chestnut	5 50		" Steamboat	4 00	4 25
Schuylkill R. A		5 00	" Broken	....	4 25
" Chestnut			" Egg	....	4 25
" W. A. Lump			" Stove	....	4 50
" Broken			" Chestnut	3 50	4

SPECIAL COALS.—DEALER'S QUOATTIONS.

Lorberry Coal	5 00	5 25	Burnside R. A. Egg & St.	4 75	5 00
Shamokin	4 75		Powelton Coal Co.		
Franklin, (Lykens Val.)		5 25	Hill & Harris, Egg & St.		4 50
Broad Top	....	5 00	Henry Clay, Egg & St.	4 50	4 75

Dealers in these coals may be found in our advertising columns.

Powelton Coal at Philadelphia, April, 1869.

Powelton Egg and Stove	$5 00	Powelton Gas	$7 80
Powelton Semi Bituminous	5 00		

Scranton Coal at Elizabethport, April, 1869.

(Corrected weekly by D. L. & W. R. R. Co.

Lump	4 75	....	Egg	....	5 00
Steamer	4 75	....	Stove	....	5 50
Grate	4 75	....	Chestnut	....	4 75

Prices for Pittston Coal at Newburgh, April, 1869.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton, 2240 lbs		4 60	Egg " "	4 70	....
Steamer, " "		4 60	Stove " "	....	5 00
Grate " "		4 60	Chestnut " "	4 75	....

70c. Freight to New York.

Lackawanna at Rondout, April, 1869.

Lump	4 75	....	Egg	....	5 00
Steamer	4 75	....	Stove	....	5 00
Grate	4 83	....	Chestnut	....	4 75

65 cents Freight to New York.

Old Company's Lehigh Coal at Mauch Chunk.

April, 1869.

Lehigh L'p and Steamboat	$3 50	Stove	$3 75
Broken and Egg	3 50	Chestnut	3 25

Lehigh Coal at Elizabethport, April, 1869.

Lump	6 00	....	Stove	....	5 50
Steamboat and Broken	5 25	....	Chestnut	....	5 00
Egg	5 25	....			

50c. Freight to New York.

Wilkesbarre Coal at Hoboken, April. 1869.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	4 75	....	Egg	....	4 85
Steamer	4 85	....	Stove	....	5 25
Broken	4 85	....	Chestnut	....	4 65

45 cents Freight to New York.

At Baltimore, April, 1869.

Wholesale prices to trade.					
Wilkesbarre by cargo or car load	$	5 60	Trevorton R. A	$	5 40
Pittston and Plymouth	5 40	5 65	By retail, per ton of 2,240 lbs., delivered	8 00	8 50
Shamokin R., or W. Ash	....	5 40	Georges C'k & Cumberland f. o. b. at Locust Point for shipping	....	5 00
Lykens Valley, R. A	....	5 65			

At Havre de Grace, Md.

Cargo prices for shipment *south* of Patapsco River, (drawback allowed of 10 per centum.)			Shamokin R. or W. Ash	$....	@....
			Lykens Valley R. A	....	....
			Trevorton R. A	....	....
Wilkesbarre and Pittston W. Ash	$....	@....			

At Georgetown, D. C. and Alexandria, Va.

George's Creek and Cumberland f. o. b. .... @4 75

Prices of Gas Coals.

April, 1869.

PROVINCIAL. Duty, $1 25	Coarse. Gold.	Slack. Gold.	AMERICAN.	Coarse. Currency.	Slack. Currency.
Block House	$1 75 @$	75	Westmoreland Co	$8 50	$8 00
Gowrie	1 75	75	Despard Coal Co	8 50	8 00
Lingan	1 75	75	Penn	8 50	8 00
Sydney	2 13½	71½	Newburgh Orrel Gas	8 50	8 00
Pictou	2 13½	1 18½	West Fairmont Gas Coal	....	7 00
Little Glace Bay	1 75	1 00	Powelton Gas Coal	8 00	7 00
Caledonia	1 60	75			

Prices of Foreign Coals.

April.

Duty, $1 25 per ton.

Corrected weekly by PARMELEE BROS., 32 Pine Street, N. Y.

Liverpool Gas Caking	$ 9 50	Liverpool House Cannel	18 00 19 00
" " Cannel	14 00	" " Orrel	16 00 18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD.

Liverp'l House Orrel, scr'd	$16@18	Liverp'l House Can'l, scr'd	$18 00 20 00

Per ton 2000 lb., delivered.

Coal Freights.

(Corrected Weekly).

Freights on Coal Sea-borne from Port Richmond, Philadelphia.

March 18, 1869.—From Philadelphia and Reading R. R. Wharves, Phila., to

Bangor	....	....	New London	— —	1 80
Boston	2 00	2 50	Dover	— —	2 50
Providence		2 00	Cohasset Narrows	— —	2 50
Lynn	and discharging	2 50	Cambridgeport	— —	2 75
Portland	2 00	2 50	Dorchester	— —	2 50
Fall River	2 00		Fair Haven	— —	2 00
New Bedford		2 00	Gloucester	....	2 75
Salem	....	2 50	Lawrence	— —	3 00
Newport	— —	2 00	Old Cambridge	— —	2 53
East Cambridge	— —	2 50	Saco	— —	2 75
Newburyport	— —	2 50	Roxbury	— —	2 75
Portsmouth	— —	2 50	Salisbury	— —	2 75
Charleston	1 75	2 00	Greenport	— —	2 00
Danversport	and discharging	2 50	Norwich	— —	2 00
Amesbury	— —	2 75	Harlem	— —	1 45
Beverly	....	2 50	New Rochelle	1 30	1 40
Charlestown	....	2 50	Sag Harbor	— —	1 50
Hingham	....	2 50	Spuyten Duyvel	— —	1 35
Marblehead	....	2 50	Williamsburg	— —	1 35
Nantucket	— —	2 50	Jersey City	— —	1 35
Plymouth	— —	2 50	New Brunswick	— —	1 20
Provincetown	— —	2 25	Alexandria	— —	1 25
Washington	— —	1 40	Fredericksburg	— —	2 00
Calais	— —	2 75	Wilmington, Del	— —	75
Machiasport	— —	2 75	Bath	....	2 50
Hoboken	....	1 35	East Greenwich	....	2 00
Hyannis	....	2 25	Albany	....	1 95
Malden	....	27 5	New York	....	1 35
Nahant	and discharge	2 50	Troy	....	1 95
Weymouth	and towing	2 50			

Provincial Freights.

TO NEW YORK.		TO BOSTON.	
Sydney	$	Sydney	$
Lingan		Lingan	
Cow Bay		Cow Bay	
Port Calidonia		Port Calidonia	
Little Glace Bay		Little Glace Bay	

From Elizabethport and Port Johnson.

Albany	$....@—	—	New London	$1 15	— —
Boston	1 75	— —	Newport	1 40	— —
Bridgeport	1 —	— —	New York	50	— —
Fall River	1 40	— —	Norwalk	1	— —
Hartford	1 50	— —	Norwich	1 25	— —
Hudson	1 00	— —	Pawtucket and towing		— —
Wareham		— —	Portland	1 75	
Middletown	1 40	— —	Portsmouth	11 75	
New Bedford	1 45	— —	Providence	1 40	— —
Newburyport	2 00	— —	Salem	1 65	— —
New Haven	1 00	— —	Augusta	3 00	— —
			New Orleans	13 00	— —

Foreign Freights.

New Castle and Ports on Tyne			£15@£18 keel.		
Liverpool			12s. 6d.@15s. ton.		
Australian	9 50@10 00		Lehigh	15 50@16 00	
do. Wallsend	10 00	10 50	Liverpool	13 00	....
Bellingham Bay	11 00	....	Pittston, ton	14 50	15 00
California	7 00	9 00	Scranton	14 00	15 00
Cumberland cks	30 00	32 00	Scotch	13 00	....
do bulk	28 00	....	Vancouver Island	12 50	....
Chili	10 00	....			

Rates of Transportation to Tide Water.

[BY RAILROAD.]

To Port Richmond, Philadelphia.

Philadelphia and Reading Railroad, from Schuylkill Haven $2 00

The following are the drawbacks allowed on all coal shipped East of New Brunswick and South of Cape Henry, until further notice.

	Drawback.	Freight.	Nett
Lump	1 10	$2 ..	$ 90
Steamboat	1 10	2 ..	90
Broken	1 00	2 ..	1 00
Egg	1 00	2 ..	1 00
Stove	75	2 ..	1 35
Chestnut	90	2 ..	1 10

From Port Carbon, 8 cents per ton more.

To Elizabethport.

L. V. Railroad from Mauch Chunk to Easton	$ 1 81
C. R. R., N. J., Easton to Elizabethport	1 22
	2 03
Shipping Expenses at Elizabethport	25
Total	2 28

To Port Johnson.

L. V. R R	$ 81
C. R. R. of N. J	1 29
Shipping Expenses	25
Total	2 35

To Hoboken.

L. V. R.R	81
Morris & Essex R.R	1 29
Shipping Expenses	25
Total	$2 35

London Weekly Metal Report.

LONDON, E. C., 24th March, 1869.

The Metal Market has been inactive, and but little business will be done until after the Easter holidays.

IRON.—A fair demand exists for Welsh bars and rails. Prices are unaltered. Staffordshire descriptions are easier to buy. Scotch Pig iron has a downward tendency, closing at 52s. 10½ cash.

COPPER.—There appears to be a better feeling for Chili bars, £72 reported paid afloat, and with some prompt, the value on the spot is £70. 10s. to £71; ores and regulus 14s. 3d. English manufactured continues quiet, but Tough is difficult to buy from Smelters at their official quotations. Australian neglected. Burra and Wallaroo £82 to £83.

TIN has been steady but quiet. Straits on the spot £130; Banca buyers £132; English firm at official quotations. The Dutch market is firm at 80½fl. on the spot, 81½fl. to 82fl. ex the sale.

TIN PATES are in fair demand, but pending the quarterly meeting of the manufacturers in Gloucester, on the 31st instant, makers are indifferent to book orders.

LEAD is steady; good soft English £19. 7s. 6d. to £19. 10s.; L. B., £19. 12s. 6d. to £19. 15s.; W. B., £20. 15s.; Herbst & Co., Refined, £20. 10s.

SPELTER is dull, no business reported; common brands in London £21 to £21. 2s. 6d.; in outports, £21; sellers, specials, £21. 7s. 6d.; V. and S., £21 nominally; Rhenish and Belgian, £20. 15s.

VON DADELSZEN & NORTH.

SAN FRANCISCO STOCK MARKET.

A telegram from San Francisco, dated April 7, quotes:

STOCKS.	Per Sh.	SHARES.	Per Sh.	
Gould & Curry	113@ 110	Belcher	17	..
Savage	77 78	Imperial	87	85
Chollar Potosi	185 ...	Alpha	28	..
Hale & Norcross	85 84	Amador	..	
Crown Point	60 59	Kentuck	262	261
Yellow Jacket	61 ..	Ophir	35	

DIVIDEND—Savage Mining Co.—$4 in coin per share. Payable 10th inst.

Copper Stocks at Boston.

The following are the prices of mining stocks bid in Boston this day:

Copper Falls	8	Quincy	24½
Franklin	16½	Cary Improvement	8½
Hancock	4	Hecla	..
Minnesota	2	Bos. Hart. & Erie R. R.	23½
Calumet		Isle Royal	..
Water Power	..		

Special Notices.

The Hardick Steam Pump Suit.

EDITOR JOURNAL OF MINING.

SIR:—The undersigned having been informed that this Pump has become the subject of misrepresentation on the part of enemies thereof, who with a view to destroy and injure his business, and the use of said Pump, have been circulating various reports, to wit: "That the undersigned had disappeared," "That any one buying a Hardick Pump would involve themselves in trouble," "That the works were in other hands," and other equally unfounded malicious and false reports.

That no one may be deterred from purchasing, if satisfied these Pumps are preferable for their use, the undesigned hereby desires to state publicly and for the information of all concerned, and to have it distinctly understood that he is, and since the month of July, 1868, has been, the sole manufacturer of these Pumps, and that since the aforesaid date, he has not used the Piston on which the alleged infringement is claimed, nor further intends to use it, a practical examination having proved it entirely useless, and rather a detriment to the Pump; neither does the claimant attempt legally to recover on any Pumps manufactured since that date, all his actions having been brought on Pumps manufactured previous thereto by the firm of "Campbell & Hardick Bros," said firm being now dissolved by the decease of two of the partners, hence the suit of Poillon *vs.* Hardick, for Pumps made under the old partnership; it will therefore be readily understood that present purchasers cannot in the most remote degree become affected in any manner by this suit.

And now for the facts in relation thereto: During the month of July, 1868, it came to my knowledge that this man claimed a patent granted July 21, 1857, on Grooves in Piston of Steam Valve. Not having previously given the matter any minute attention, I immediately caused a test to be made, and found that these grooves were in no manner essential to an efficient operation of the machine and consequently of no use to me or the Pumps; notwithstanding, I immediately endeavored to settle the matter with Poillon for the purpose of avoiding annoyance to the past patrons of the Pump. My offer he would only accept on the condition that I should continue the use of the Grooves, pay him a royalty therefor, and allow him to use me against other parties whom he purposed to sue, thus presenting me the alternative of an expensive law suit, or to become a willing tool in the prosecution of other parties, for what I deemed an unjust claim, which latter disreputable position I could not accept, hence the suit which is now being vigorously pushed forward, and will decide the matter in this case; I have already proved by abundant testimony of the most reliable witnesses, that grooves to permit the entrance of steam for packing pistons, and other steam joints, precisely like the Poillon patent have been in use in different parts of the United States long before any patent was granted to Poillon, and for upwards of twenty years. In addition to this, I have a large amount of further testimony showing the use of the same thing by other parties many years before the date of Poillon's patent.

I take this method to state that I am prepared to show any one who desires information on the subject, the fullest proofs of the long continued public use of this pretended invention, and I hereby caution purchasers against being deceived by the threats and announcements of any one. No person need have the slightest fear of using my pumps, and I trust that nobody will be frightened into paying a royalty thereon.

CHARLES B. HARDICK,
Niagara Steam Pump Works.

BROOKLYN, April 8, 1869.

The Ellershausen Process.

At the works of the Bethlehem Iron Company, Bethlehem, Pa., a number of trials of the Ellershausen process have been made during the last two or three months, the object being to ascertain whether it could be adopted advantageously there in the manufacture of railroad bars.

As I witnessed it at those works on the 9th instant, it was conducted as follows:

During a cast at one of the Company's blast-furnaces, a portion of the metal was led from the pig-bed, and run directly into a barrel-shaped ladle sunk in a pit at the lower end of the cast-house, and near to where a turn-table about eight feet in diameter was erected. When the ladle was about one-fourth full, or contained some 1200 cwt., the flow of metal was cut off; the vessel was then hoisted by means of a crane to above a level with the table, swung over towards it, and carefully tilted by the handles, so as to allow the molten mass to be slowly poured into a semicircular clay basin, and from the straight side of this to flow in a uniform, broad, thin stream, as over a dam, into cast-iron boxes forming the outer rim of the table: the table during the operation being kept turning rather briskly by a crank and level gearing underneath. In front of the mouth of the basin and above it, was a wooden bin containing coarsely-pulverized iron ore (the granular magnetic oxide from Lake Champlain); from this bin and by means of a sliding-gate regulated by hand, the ore was allowed to shoot down a short, broad trough on inclined plane to meet the metal from an opposite direction, and mix with it, and allow the two to fall together in one stream into the boxes. By these operations a thin layer of iron, more or less intimately mixed with ore, was formed in the boxes at every revolution of the table. When the boxes were nearly full, the flow of metal and ore was stopped, and the process was at an end. Each box or compartment of the table, was thus made to form one block or *ingot* of the mixed mass. The ingots, when cold, were not solid, or even very hard, but for the most part granulated, or shotted and porous, something like a sponge, and could be readily broken up with a hammer; in color the material was blue-black. From the furnace the ingots were taken to the puddling department or mill and there partially broken, weighed into charges, re-heated, worked, and balled in the common puddling furnace, and from thence went to the squeezer and to the rolls in the usual course. The ordinary charge for the double puddling furnace ranged from 1050 to 1200 pounds.

I saw the working of only one charge in a single furnace, the weight of which was 575 pounds; the material was shovelled, if I recollect rightly, into the furnace; it was a broken, granulated mass; the time consumed in making the heat (from closing of the furnace-door to taking the balls two of them, to the squeezer), was one hour and a quarter, and the product 434 pounds of bar. The weight of the slag was not ascertained.

☞ A new system of telegraphy, invented by Bonelli, has recently been brought to public notice at Paris. The Emperor, Napoleon III., to whom it was submitted, it is stated, has expressed his complete satisfaction with the new process—the advantages of which consist in the perfect and authentic exactness of the messages sent, as well as the increased rapidity of transmission. The Government director of the French telegraphs has been authorized to offer every facility necessary for the general adoption of the new apparatus.

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NEW YORK, SATURDAY, APRIL 10, 1869.

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NOTICE TO CORRESPONDENTS.

In consequence of a new regulation recently adopted by the Postmaster of this city to facilitate the early delivery of mail matter, we have to request our correspondents, in addressing us, to give the number of our post-office box, No. 5,969, in lieu of, or in connection with our business office address.

AN IMPORTANT CORRECTION.

In the list of American and British students at the School of Mines in Freiberg, Saxony, published in my recent report to the Secretary of the Treasury, six names have been unaccountably omitted. They are those of JAMES WATT (1727), STEPHEN D. BUCHANT (1836), and ADOLPH STEINHAUSER (1836), of England; THOMAS MACFARLANE (1856), of Glasgow, an engineer of experience and reputation in Norway, the United States and Canada; WILLIAM T. BLAOFORD (1854), of London, now superintendent of the Geological Survey of Bombay; ALFRED BETTS (1852), of Birmingham; HENRY BLEIDORN (1854), New York; RICHARD J. KERNICK (1856), of Cornwall; and WADSWORTH BUSH (1861), of England. The discovery of this serious defect in the list, too late for its correction in the proof-sheets, is the more painful to me, since I made use in my report of the strong expression (having in my mind some aggravated cases of charlatanry) that my publication of the names of students might serve to "expose the swindlers who pretend to come from Freiberg, and the absence from this list of the name of any American or Englishman who claims to have studied at the academy before the year 1866, will be conclusive proof of the falsity of his claim." I shall use all possible means to give extensive publicity to this correction; and it is some consolation to me that I do this before any one of the gentlemen thus wronged has publicly or privately complained—possibly before any one of them has discovered the fact. I will add that the official list given by me of course does not include students under private tuition only, nor graduates of other institutions who may have visited Freiberg in the course of their professional education, without enrolling themselves among the members of the academy and regular attendants upon the lectures.

R. W. RAYMOND,
United States Commissioner of Mining Statistics.

New York, April 5, 1869.

P. S.—The London *Mining Journal* and the *Colliery Guardian* will confer a favor on MR. RAYMOND by republishing the above statement.

COAL FREIGHTS IN IRON STEAMERS.

In a few days will be launched at the yards of REANEY, SON & ARCHIBALD, Chester, Pa., the first of several iron steam colliers, built for the Pennsylvania, New York and New England Navigation Company; and on the 15th instant, she will be ready for the trial trip, which we have no doubt will demonstrate the practicability of cheap coal freights by steam, and inaugurate a revolution in the trade. We have watched for years the progress of the British General Iron Screw Collier Co., which has thirty steam vessels running from Newcastle-on-Tyne to London. These vessels were built at a cost of £8,000 sterling each, or about $54,000, exclusive of full equipment. The capital of this English coal carrying corporation was originally £250,000 sterling. The enterprise has rewarded this investment with a yearly profit of twenty-five per cent. It occurred to W. D. CRANE, Esq., of New York, (W. C. CRANE & Co., Boston) a year ago, that steam navigation should be called into our coal service also, and to him is due the conception and execution of the scheme now being developed on this side the Atlantic. Twenty-five million tons of coal, representing $90,000,000, and employing $100,000,000 of capital in mines, $25,000,000 in sailing vessels—this is the aggregate of the coal business of the United States to-day; and all this depends upon freighting facilities and rates. We have no doubt that our home experience is similar to that of our British neighbors, that the vessels now engaged in the coal trade are too generally of inferior building qualities, and poorly adapted to their special line. The duration of voyages, time in port, and prevalence of adverse weather and winds, are to be overcome, before fluctuation in prices of fuel can cease. The potent facts, also, that coal is of greatest value when used as soon as possible after it is taken from the pit, and that the non-arrival of vessels necessitates the deposit of large heaps at the mouth of the mines, which deteriorate by atmospheric action and breakage, call for a remedy of the evils of inadequate transportation. Mr. CRANE has had four grand objects in view:

1. A steady and certain supply of coal.
2. A lower range of prices, with less fluctuations.
3. A better quality of coal, by avoidance of its breakage and exposure. This is especially applicable to bituminous coals.
4. A saving of interest upon capital to large consumers, and freedom from the danger of spontaneous combustion, consequent upon keeping large quantities stored.

The expectations of success indulged by this new company, are founded upon the transatlantic enterprise, special and careful calculations of costs and receipts by competent parties, and the further fact, that their largest railroads, merchants and consumers, have endorsed their mode of transit, in frequent letters to the company, and in the more substantial form of heavy subscriptions to the stock.

Their capital is ample. Five ships are already under contract. Strange as it may seem, they cost materially less than Clyde-built vessels. The "Rattlesnake," first launched, is a model of convenience for the carrying business, and may give a general idea of the others. She is 170 feet long, draws 10 1-2 feet water, and is divided inio three compartments, of 225 tons capacity aft, 200 tons amidships, and 175 tons forward, enabling her to go to any wharf. For 98 feet under these she is ballasted with water, and can thus make return trips light without waiting for a cargo, if desirable. The hatchways are constructed to fit the schutes at the Reading Railroad wharves, being 36 feet from centres. The platforms on the new wharves built at Boston, for the company, by the Lowell Railroad are adapted to the same end; and thus these railroads are able to guarantee to load and discharge in ten and twelve hours respectively. The cost of maintaining one of these propellers, with a condensing engine of 146 horse power, and 40 sq. feet grate, is best exhibited by a few figures:

Coal used per 24 hours, 10,512 pounds, or 3 lbs. per hour to each horse power.

Speed—under steam alone can be 7 knots per hour; under sail, one knot per hour average.

Voyage—Philadelphia to Boston, 1,000 miles, steaming at above speed,	4 days,	15 hours.
Berth ready, but allow	0 "	9 "
Loading,	0 "	12 "
Discharging,	1 "	0 "
Delays,	1 "	0 "
Total,	7 days.	12 hours.

EXPENSES.

Hands and officers—11 men,	$460	per month.
Coal for 30 days,	600	
Provisions,	198	
Repairs and port charges (contracted for),	40	per month.
Interest on capital,	350	"
Total,	$1,723	

It is believed, on comparison of these figures, which are the average of actual estimates, with the exhibits of twelve schooners of 500 tons capacity, that an average of four voyages per month, of seven and a half days per voyage, can be made, and that a large profit per ton can be secured even at an enormous reduction of freight rates, all other advantages of steam shipment aside.

We conclude by again expressing our belief, that the launch of the "Rattlesnake" is the opening of an epoch in the coal trade. The miner, shipper, manufacturer, freighter and consumer, are the best judges of the benefits of constant supply and capacity equal to demands, cheap rates of carriage and absolute certainty. And these prospects are the more gratifying features, since we are assured that the Pennsylvania, New York and New England Steam Navigation Company is not like a mere hasty speculative enterprise, but the development of ideas entertained by solid merchants, whose powers as well as heads will prove their faith and success.

DIAMONDS.

One of the ways by which the question of the manufacture of artificial diamonds has been approached, is the study of its natural conditions, to determine if possible the method of its formation. The fact that carbon occurs in the organic world as charcoal, and that it crystallizes at high temperatures as graphite, has led many to surmise that the third allotropic form of the carbon, the diamond, is probably produced from liquid solution, simply because it is known that the other two forms are not so produced. It has frequently been said that if we could discover a solvent for carbon, we could easily obtain the diamond by crystallization. This notion has been considerably weakened by the actual discovery that minute diamonds may be formed by the current of a strong battery; and to this indication must now be added an observation by Mr. SORBY, of England, whose industrious and ingenious microscopic researches into the structure of minerals have thrown much light on an important field.

This gentleman, having turned his attention to the proposed microscopic cavities in diamonds, described by BREWSTER, finds that they are in reality enclosed crystals; and his conclusions, deduced from the consideration of the whole structure of the diamonds, are not opposed to the theory of its formation at high temperature. The *Chemical News* says:

"The crystals enclosed in diamonds are frequently seen to be surrounded by a series of fine radiating cracks, which are proved to be the result of the contraction suffered by the diamond in solidifying over the enclosed crystal, and this explanation has been artificially verified by examining crystals formed in fused globules of borax glass, cooled slowly, when the same phenomena are seen."

If this be true, we must perhaps try to melt, instead of dissolving, carbon. The phenomenon already alluded to, of the deposition of minute diamond, crystals upon one electrode of a battery, from the other electrode (which is clean coal) is a case of fusion and re-crystallization; though it is difficult to perceive how firmly particles of charcoal should under such circumstances escape oxidation. An attempt was made in France to test this theory. A piece of charcoal was subjected *in vacuo* to the concentrated rays from a powerful burning glass, and at the same time to the galvanic current from an immense battery. It is reported to have *volatilized without fusing*.

It now remains to subject carbon to a heat as intense as that of the last-mentioned experiment, removed from contact with the air, and under a pressure sufficient to prevent its volatilization. Let our modern diamond-makers grapple with these conditions. Simple as they sound they are calculated to task mechanical ingenuity. We do not promise that their fulfillment will result in a crop of kohinoors; but it strikes us that carbon must be "more or less than mortal" not to do something decisive when "cornered" in this vigorous manner.

THE LURMANN IMPROVEMENT IN BLAST FURNACES.

The use of LURMANN's improved blast furnaces, with closed fronts, (introduced into this country by Mr. ASMUS) is making rapid progress on both sides of the Atlantic. In Germany it finds universal adoption. Even the celebrated royal Prussian iron-works (Koenigshutte) in Silesia have become the scene of its triumph; and a hearty official endorsement is accorded to it from that most influential quarter.

Very satisfactory reports have also been received from a number of charcoal, anthracite and coke furnaces in the United States. The claims of the inventor, or, at least, those of his cautious partner and agent, Mr. ASMUS, seem in most cases to have been more than realized. The weekly production is increased fifteen per cent. and upwards; while that which was formerly considered the most arduous portion of the labor at the furnaces is entirely abolished.

Among the establishments at which this patent cinder-block is now in operation, we may mention the Thomas Iron Works, Hockendouqua, Pa.; Shoneberger, Blair & Co., Pittsburg; Brady's Bend Iron Co., Pa.; Carbon Iron Co., Parryville, Pa.; Northampton Iron Co., Bethlehem, Pa.; Sligo Furnace, Pa., (charcoal); Pennsylvania Furnace (charcoal); Muirkirk Furnace, Md., (charcoal); Cleveland

Rolling Mill Co.; Chicago Iron Co.; and New Jersey Zinc Co., Newark, N. J.

In a few cases, the introduction of the new improvement has not been attended with satisfactory results; but superintendents and workmen will hardly be able, in view of its universal success, to satisfy their employers that the fault is in the principle of the invention itself. It is not surprising that prejudice and private interests should in many cases delay the introduction of really beneficial improvements; and on failures arising from such causes, we shall waste no words at present. We think it well, however, to warn American ironmasters against one of their own besetting sins, which, in the present instance, may lead to unnecessary disappointment.

In trying an invention like LURMANN'S cinder-block, which has been already endorsed by experience, an ironmaster, who is not yet familiar with it should follow strictly the directions of the inventor. One of the great difficulties with which this improvement has had to contend has been the itching desire of American metallurgists to vary it *before they had tried it.* Many are afraid that the cinder will not run through a hole so small as the drawings prescribe; and they at once increase the bore of the cinder discharge, thereby materially lessening the advantages which it secures, by necessitating a periodical stoppage of the blast. One inch and a half at the narrowest part is large enough diameter of cinder-discharge for the largest anthracite furnace. If these dimensions are exceeded, the blast soon follows the cinder with such force, that it must be turned off or slackened to allow the opening to be closed.

We do not insist upon a continuous discharge of cinder, though LURMANN himself has obtained in this way the best results; but we think both fairness and prudence should lead our furnace men to adhere to the proportions and constructions he proposes, until they have used them long enough to be certain they can better them.

CRYOLITE IN IRON FURNACES.

The *Colliery Guardian* contains the following paragraph:

"An invention patented by Messrs. JAMES BOWRON and GEORGE LUNGE, of England, consists of mixing fluoride of calcium, the same being obtained artificially or in the form of a native fluor spar, or the mineral known as "cryolite," either in a state of fine division or otherwise, with the materials used in blast furnaces, for the purpose of removing, wholly, or in part, the phosphorus contained in the pig iron to be obtained therefrom. The invention further consists in using fluoride of calcium in puddling and other furnaces, to aid in the manufacture of wrought iron and steel by the removal of the phosphorus contained therein. The phosphates resulting from such treatment may be utilized as manure."

We hear that the "STEVENS Flux," notorious in this country for its brave promises and halting performances in the extraction of "more gold than could be found by ordinary assay," has already found a sphere of real usefulness in the metallurgy of iron—though we are not prepared to say that its application is novel, or that its employment at the price charged for it will prove economical. As we have often said, whatever good qualities the STEVENS Flux possesses are probably shared by native fluor spar; and now, for the consolation of Col. STEVENS, we will reverse the case, and say that whatever advantages the above patent of BOWRON and LUNGE presents, are probably shared by his Flux. What's sauce for the goose is sauce for the gander.

Wieliczka.

The article furnished in this week's JOURNAL OF MINING, by Mr. ROBERT HENSCHKEL, throws a clear light upon the origin and extent of the recent disaster at Wieliczka. It is evident that the lack of proper precautions, and of a due study of the geological structure of the mine, led to a catastrophe which might have been avoided. The resolution to extend a certain level blindly a certain number of feet in a given direction, should never have been adopted, in ground traversed by an anticlinal, and characterized by flexures of the strata. Every miner knows that a level, a shaft, or even a bore-hole, may establish a connection where none previously existed, between wet and dry strata; and such a result was especially to be feared and avoided in a rock-salt mine.

It would be of course unwise to commence pumping out the water in this case, before adequate means were at hand for the thorough and rapid accomplishment of the work. Such a course would only replace the saturated brine with a fresh and hungry material, calculated to damage still further the underground workings. It still remains to be seen, how much ruin may have been wrought by the flood in those lower levels to which it has had complete access. No doubt it has eaten out the salt from the rock, and its removal will probably be followed by the caving of some of the works, and considerable injury to lumbering, etc. We await with interest the results of the present endeavors, though we fear the pristine glory of Wieliczka has departed.

ANSWERS TO CORRESPONDENTS.

WM. S. C., OF ———. The usual estimate for one nominal horse-power in the steam engine is that the product of the pressure on the piston in pounds, with the distance passed over in one minute in feet, is 33,000; consequently, a pressure of 33,000 pounds moving one foot, 3,300 lbs. 10 feet, 330 pounds 100 feet, or 33 pounds 1,000 feet, would be considered equal to one horse-power. This is, however, more than average horses will perform steadily with suitable machinery. The worst method of applying the power of a horse to the propulsion of machinery is, in our opinion, the endless chain horse-power in common use, even when properly made and set with reference to the machinery to be driven. In this contrivance the loss by friction is enormous, rotating wheels having to bear continually the whole weight of the horse and the shock of his steps. The only reason that it is commonly used is that it takes up little more room than the horse himself, and is easily transportable. This is not the case with the whim, which undoubtedly, when of larger diameter, is the most advantageous disposition of the tractive power of the animal.

JOHN DEAN.—The process of calcining or roasting ores is supposed to have been discovered by the Romans. With regard to your second question, we cannot give explanations of inaccurately reported facts. That vapors have been seen rising from the earth over silver veins, is quite probable; that flames have been observed in such localities is possible; that explosions have been heard issuing from unopened mineral veins we do not believe; nor is it likely that any of these phenomena, if they do occur, are connected with the presence of silver. Veins are very frequently the channels of subterranean springs; and this fact will explain most of the appearances which have been really observed in their neighborhood. "Chemical changes in sulphurets" usually take place too slowly under such circumstances to produce visible effects of this sort.

A. C. C.—We do not feel called upon to condemn the HAGAN Super-heated Steam Furnace as a humbug, since it is a *bona fide* attempt to improve the process of roasting; but we are not sanguine of its success. The use of steam in this way has been carefully tried in Europe, and results seem to prove that it brings no additional advantage, except perhaps in the treatment of certain rich silver ores, and certain poor iron ores. You will find a full discussion of the subject in a series of four articles, beginning on page 169, Vol. VI, of the JOURNAL OF MINING.

R. P., OF ZACATECAS.—The best machines for concentrating tailings, where water can be employed, are sluices, buddles and shaking-tables, which can be more economically constructed on the spot than manufactured at a distance. See KUSTEL'S work on Concentration. For dry concentration, we believe KRUM'S machine to be one of the best. Concerning the amalgamator of which you write, we have little knowledge, and no very flattering opinion. So far as we know, it has not been tested by practical use to any extent.

R. T. J., OF NEW ORLEANS—Inquires concerning two Nevada Silver Mining Companies, the "Bunker Hill Gold and Silver Mining Company," and the "Mutual Mining Association," last year having an office at 141 Broadway, and Mr. HARLAN for Secretary. We do not know what has become of them, but perhaps this notice will stir them up. The mill formerly belonging to a "Bunker Hill Co.," in Bunker Hill District, Nevada, has been moved to White Pine.

M., OF SHULLSBURG, WIS.—The manner of usingsteam which you suggest is quite feasible, but not new. You will find it described in works on the steam engine.

NEW PUBLICATIONS.

The BROOKLYN MONTHLY is a new and lively periodical, mainly devoted to the interests of the dormitory across the East River. The second number is better than the first, and contains so many contributions of interest and value from Brooklyn pens, that we wonder why the second-hand stupidity of TROLLOPE'S novel should be found necessary to "fill up" withal. We hope that the kindly atmosphere of success will enable the new monthly to develop its original features and sluff off the rest.

AMERICAN INSTITUTE.

Proceedings of the Polytechnic Association.

MEETING HELD AT THE ROOMS OF THE ASSOCIATION April 1, 1869.

PROF. S. D. TILLMAN, IN THE CHAIR.

The meeting was opened by the reading of a paper on "Sand" by DR. FEUCHTWANGER. A full report of this paper will be found in another column. The Doctor's remarks were listened to with marked attention and great interest. The specimens with which he illustrated his paper were remarkably beautiful, especially some of the agates, and their congeners. One specimen of quartz crystal was peculiarly fine, and elicited the warmest admiration.

At the close of the Doctor's paper, several inquiries were made by persons in the audience.

Mr. FISHER wished to know Dr. Feuchtwanger's opinion in regard to water pipe made of coarse bottle glass. The Doctor replied that water pipes of this kind had been largely used in England and to a limited extent in this country. Mr. HAMILTON E. TOWLE presented a specimen of what is known as "black diamond," such as are used for drills, for cutting rocks and millstones and wished to know if they were real diamonds or not.

DR. FEUCHTWANGER.—I presume they are selected specimens of corundum. I never saw more then two specimens of real black diamond in my life.

DR. VANDER WEYDE thought, from a slight examination, that they were true diamonds.

[There are specimens of diamond which are dark and low-priced, and may be used for drills and picks—REPORTER.]

HILL'S AIR ALARM.

Mr. HAMILTON E. TOWLE presented a model of Hill's Patent Air Alarm, for giving notice of the attack of burglars upon banks, safes, dwellings, &c., and for the purpose of preventing the escape of prisoners from jails and penitentiaries, &c. The principle of the invention consists in using *tubes* either charged with air or exhausted. These tubes are connected with conducting pipes.

Any attack whatever upon the pipe, tending to derange it, communicates to the alarm clock any change in the density of the air enclosed in the pipes. The alarm clock may be situated at any desired point, and every interference with the pipe will cause a change in the density of the air in the case to which the alarm is attached, and thus set it off.

The tubes are provided inside with small steel rods left free to roll, if an attempt should be made to saw the grating.

The door of a safe may be provided with a conducting tube, the end of which is closed by a valve attached to the door—either *outside* or inside.

Any partial opening of the door allows the air in the tube to start the alarm. Several *alarms* on several doors or gratings may be connected with a single connecting tube, and all the alarms be set in action by any tampering with any part of the arrangement. In the jail at Portland, this invention has been in use two years, and the Sheriff and United States Marshal pronounce it "the only prison grating in which perfect security is obtained."

RAILWAY ACROSS THE APPENINES.

Mr. JOHNSON exhibited and described a map showing the line of the railway across the Appenines. This railway presents many very remarkable features. In a distance of fifty miles, there are twenty-three (23) bridges and forty-five tunnels, which vary in length from a few hundred feet to over 9,000 feet. At the point where the railway reaches the plain, it is 2,000 feet above the level of the surrounding country, and descends by a very circuitous zig-zag track. Mr. Johnson derived most of his facts from a pamphlet published by Mr. COOK, who in 1858 escorted a party of one hundred persons through most of the remarkable scenery of Europe. As the travelers formed a somewhat numerous party, they were enabled to contract for board-bills, &c., at very reduced rates.

NEW DREDGING APPARATUS.

Mr. JOHNSON then exhibited a model of a new apparatus devised by himself for dredging. This dredger consists of an air-tight barge, furnished with a large hole in the bottom, for the purpose of discharging the load—this hole being closed at other times by means of an air-tight cover. The barge is filled by atmospheric pressure applied as follows: From the deck of the barge proceeds a large tube, which descends to the surface of the mud or other matter to be removed. As soon as the barge is exhausted of air, the mud, &c., will be forced up this tube, and will fall to the bottom of the barge. The water is pumped out by the same means that the barge is exhausted of air in the first place, and when a load has been secured, the barge is towed off and emptied.

EWBANK ON THE STEAM ENGINE.

Mr. WHITNEY, at the request of the chair, read a portion of a paper on the steam engine, which has recently been published by Mr. EWBANK. After Mr. WHITNEY had concluded, the chair stated that the subject was open for discussion, and that it was due to Mr. EWBANK that the club should give a respectful consideration to the paper. The difficulty found by most of the members in following Mr. EWBANK'S argument through the reading of a somewhat lengthy paper prevented any immediate remarks.

The chairman in the meantime gave a very lucid explanation of the difference between the high pressure and low pressure engines, claiming, however, that in so far as economy is concerned, the high-pressure engine is, to say the least, not very far behind the low-pressure engines.

DR. VANDER WEYDE at length said: The subject here brought before us is one of such importance, and so much intricacy, that the paper just read must be carefully examined in the study, if one would wish to give an opinion upon it. The difficulty seems to be that Mr. EWBANK confounds pressure or force with power. Pressure is not power.

We have been personally consulted, during the last ten years, by eleven different persons, who supposed they had discovered perpetual motion; and, of the eleven, no less than nine had based their inventions on this fundamental error, imagining that simple pressure or attraction would produce perpetual force. In one of our scientific papers, it was stated that a cubic inch of water, if converted into steam, would exert power sufficient to raise a ton. This is no statement at all. If they had said—"raise a ton a foot high" we would know what was meant When the element of time is introduced, we have power. Thus. 33,000 lbs. raised one foot high in one minute is a horsepower. If eight minutes be occupied in the work we have a man power.

Mr. WHITNEY.—It is some years since I first saw this theory of Mr. Ewbank's. It seems to me that in beautiful English and wealth of illustration, Mr. Ewbank is ahead of his knowledge of engineering. He tells us that a piston driven forward with a force of 30 lbs. exerts a force of but 15 lbs., because half the pressure is employed in overcoming the resistance of the atmosphere. When the piston comes back, if it could be brought back in a vacuum, 15 lbs. would be gained, but then won't it require 15 lbs. to remove the atmospheric pressure, so where is the gain?

The general impression of the meeting seemed to be that Mr. Ewbank's paper is little else than an argument in favor of the low pressure or condensing engine, and that the merits of the different engines may be safely left to the decision of the engineering profession, who will use that kind of engine which is best adapted to the particular work in hand.

Mr. JOHNSON read a paper suggesting the best method of handling the subject of light in the future discussion of the meeting, and classifying the various subdivisions of the subject.

SCHOOL OF MINES & METALLURGY UNIVERSITY OF MINNESOTA

Original Papers.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

THE CHEMICAL OPERATIONS—XII.

BY PROF. G. HINRICHS, OF THE IOWA STATE UNIVERSITY.

LAVOISIER'S EXPERIMENTS.

(*Appendix to Sections* 19 *and* 21.)

107. Combustion takes place in the atmosphere at high temperatures. The question therefore presents itself: what part does the atmosphere play in this process? That something is taken up from the atmosphere has already been concluded, from the fact that the weight of magnesium increased in the proportion of 3 to 5 by its combustion in the free air.

This great question was first solved by the famous French chemist, ANTOINE LAURENT LAVOISIER, in 1777, by means of the apparatus shown in Fig. —. This apparatus is one of the pillars on which modern chemistry was built.

108. In a glass balloon, B, provided with a long, tube-like neck, LAVOISIER placed some mercury. In the glass vessel, D, was also mercury, and the tube of the balloon reached with its long upward bent portion above this mercury, into which it was partly immersed. A bell-glass, E, inverted over the tube, so that the air in the balloon, B, and in the bell-glass freely communicated, but were completely cut off from the outer air by the mercury in D, permitted the operator to measure any diminution of the confined air.

109. LAVOISIER now heated the balloon to near the boil-

ing point of mercury. The mercury was gradually covered with a *red substance*, and the volume of atmospheric air in the apparatus visibly decreased. After 12 days' continuous heating, this decrease of volume ceased; and upon cooling the balloon to the original temperature, he found that the bulk of the air in the apparatus had *diminished about one-fifth;* and the four-fifths remaining were found to be unfit to support combustion. A lighted taper was quickly extinguished when introduced into it. Since also small animals speedily died when placed in this air, Lavoisier denominated it *azote* (without, or not fit for animal life). The French still call it by this name, but it is termed *nitrogen* by the Teutonic nations.

110. Lavoisier now collected the red substance, placed it in a retort, *a*, connected with a receiver, *b*, and a glass tube, *c*, passing under the bridge of the pneumatic trough. A glass, *d*, was inserted over the opening in the bridge for the collection of any gas passing over. Upon heating, by means of the Berzelius lamp, the retort containing the red substance, a colorless gas was seen to collect in *d*, while a mirror, *m*, composed of extremely small drops of mercury, was deposited on the colder part of the neck of the retort, and a larger drop of mercury was finally collected in the receiver, *b*.

111. A glowing taper being immersed, the gas collected in *d* burst immediately into flame, and burned vividly. The gas separated from the red substance was thus shown to possess the property of supporting combustion in an eminent degree much more so than atmospheric air. This gas in *d*, Lavoisier called oxygen, supposing that it was the acidifying principle in nature. (The term is derived from two Greek words, and signifies the acid-maker, or the source of sourness.)

By mixing one volume of this oxygen gas with four volumes of nitrogen, the gas left in the apparatus of the first experiment, Lavoisier obtained a mixture which was in every respect exactly like atmospheric air.

112. By these experiments it is proved:

I. That atmospheric air is a mixture of two gases, four volumes of nitrogen being mixed with one volume of oxygen. Both of these gases are colorless and odorless, but oxygen supports combustion, while nitrogen does not.

II. That in combustion the oxygen of the air combines with the combustible. In this experiment mercury was the combustible. Under protracted heating, it deprived the air of one-fifth of its volume and of its property of supporting combustion: that is, it took away *all* the oxygen contained in the air. That the mercury *combined* with this oxygen was proved by the subsequent heating of the red substance formed, which totally resolved itself into metallic mercury and oxygen. Furthermore, the amount of mercury obtained weighed *less* than the red substance taken; and, if this mercury had been heated again in air, it would, on being re-converted into the red substance, weigh *more* than the metal alone. (See also Sec. 98, under Combustion.)

113. The act of combustion, that is, the combining with oxygen, is now also called *oxidation*, and the process by which the original combustible (in this case the metal) is again reproduced is called *reduction*. The product of combustion (the red substance in the above case) is called the *oxide* corresponding to the combustible.

114. Thus, in the first experiment described, we have the oxidation of mercury at the expense of the oxygen of the air; and the red substance formed is mercuric oxide. In the second experiment, this mercuric oxide is reduced to metallic mercury, and the oxygen is at the same time liberated.

Similarly, in the combustion of magnesium, the white substance produced is called magnesium oxide; and the oxidation of lead produced lead, oxide (litharge.)

Some substances may, according to circumstances, produce several oxides containing more or less oxygen. When the supply of air (or oxygen) to glowing coal is scanty, carbon oxide is formed; but if the supply of oxygen is abundant, the oxide formed is found to contain a much greater proportion of oxygen, and is termed carbon dioxide (which we here may understand as double oxide.)

The further details of this subject must be deferred for a following chapter: it is only essential here to establish the general principle of the processes of oxidation and reduction.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

TABLE OF THE PRINCIPAL PROPERTIES OF THE PRODUCTS OF THE DISTILLATION OF PETROLEUM.

BY P. H. VAN DER WEYDE, M. D.

By request, I send you herewith for publication a useful table containing the principal properties of the products of petroleum. It is a compilation of several tables published from time to time in divers periodicals. The first three columns contain the common and chemical names and formula; the fourth and fifth, the corresponding specific gravity; the sixth, the temperature at which each of these liquids boil; the seventh, which is the most important, the temperature at which the vapor of the liquid will ignite when a flame is presented; and finally, the eighth and last column shows the temperature to which common crude petroleum has to be heated, in order to drive off the corresponding liquid. In regard to this point, it should be remarked that it takes a higher heat to separate a more volatile from a less volatile product, than to boil the more volatile product, when once separated. This is perfectly analogous to the distillation of spirits; it takes much more heat to separate the alcohol from the mash, than to boil the alcohol afterward, when once isolated.

Common Name.	Formula.	Chemical Name.	Specific Gravity. Water—1.	Specific Gravity. Baume Hygrom.	Temp. of Boiling Pnt	Temperature of Ignition by Flame.	Temp. of Crude Oil from which it Distilled Over.
Hydrogen gas.	C 0 H 1 H	Hydrium.				ignite at any temperature.	
Marsh gas	C 2 H 3 H	Hydride of methyl.	0.605	98 deg.	30 deg. F		30 deg.
Petroleum gas.	C 4 H 5 H	" ethyl.	0.626	94 deg.	60 deg.		70 deg.
Chymogene.	C 6 H 7 H	" propyle.	0.664	88 deg.	86 deg.		120 deg.
Elaiogene.	C 8 H 9 H	" butyle.	0.670	70 deg.	150 deg.	20 deg.	170 deg.
Gasolene.	C 6 H 6 H	" amyle.	0.705	70 deg.	195 deg.	6 deg.	230 deg.
Naphtha.	C 10 H 11 H	" caprotyle.	0.745	60 deg.	240 deg.	2 deg.	300 deg.
Benzine.	C 12 H 13 H	" heptyle.	0.785	50 deg.	264 deg.	70 deg.	400 deg.
Kerosene.	C 14 H 15 H	" octyle.	0.800	40 deg.	320 deg.	110 deg.	500 deg.
	C 16 H 17 H	" nonyle.	0.854	35 deg.	356 deg.	160 deg.	530 deg.
	C 18 H 19 H	" decatyle.	0.880	30 deg.	420 deg.	200 deg.	600 deg.
Heavy kerosene.	C 20 H 21 H	" undecatyle.	0.885	29 deg.	380 deg.	230 deg.	630 deg.
Lubricating oil.	C 22 H 23 H	" dodecatyle.	0.888	28.5 deg.	400 deg.	290 deg.	660 deg.
"	C 24 H 25 H	" cocinyle.	0.890	28.5 deg.	460 deg.	140 deg.	660 deg.
"	C 26 H 27 H	" miristyle.	0.893	28 deg.	490 deg.	212 deg.	680 deg.
"	C 28 H 29 H	" benyle.	0.895	27 deg.	520 deg.	320 deg.	690 deg.
Paraffine oil.	C 30 H 31 H	" cetyle.	0.897	26 deg.	550 deg.	350 deg.	700 deg.
"	C 32 H 33 H	" margaryle.	0.900	25 deg.	570 deg.	370 deg.	710 deg.
"	C 34 H 35 H	" stearyle.	0.900	25 deg.	590 deg.	400 deg.	720 deg.
"	C 38 H 39 H	" baleryle.	0.890			430 deg.	740 deg.
Solid paraffine.	C 40 H 41	"					
"	C 54 H_{55} H	" Ceryle.					760 deg.
"	C 60 H_{61} H	" melissyle.					780 deg.
"	C 96 H_{97} or	Heavy carburetted hydrogen.			—1500 deg.		860 deg.
Olefiant gas.	C 4 H 4						

Among crude petroleums, those of the same specific gravity as kerosene (50° B.) and higher or lighter, will ignite at the same temperatures as benzine or gasolene, since they contain these substances; on the contrary, the so-called heavy crude lubricating oils, of which the specific gravity is 35° to 30°, and lower or heavier, containing no benzine, are comparatively safe, and will not ignite but at some 150° or 200°, according to their nature. Coal oils, and principally scale oils, are much more inflammable in proportion to their specific gravity than the products of petroleum. Scale or schist oil of 45° B., spec. gr., ignites already at 90° F., whereas kerosene from petroleum ignites only at 140°; scale oil of 30° B., spec. gr., ignites at 130°, while kerosene from petroleum of the same gravity ignites only at 230° F.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

SAND: GEOLOGICALLY, CHEMICALLY AND TECHNICALLY CONSIDERED.

BY DR. LEWIS FEUCHTWANGER.

Among all the discoveries relating to the arts, none exceed in importance and usefulness to mankind, the art of glass-making. Glass is a chemical combination of sand and alkali or alkaline earth, heated to fusion, and presenting after fusion a transparent and hard body. The benefits conferred by it upon all classes of human society have been immense; the spectacle, the microscope, the telescope, and spectroscope, have showered incalculable blessings upon the world, and there are probably still greater discoveries in store for us. The history of the manufacture of glass may be traced from the present time through that of the Romans and Phoenicians, to the Egyptians, some of whose productions remain to this age. The art flourished in Tyre, in Alexandria, and lastly in Rome; and after being depressed for some ages, again revived under the Venetians, who transmitted the improved art to the rest of the nations of Europe. Pliny relates that glass was first discovered by accident in Syria, at the mouth of the river Belus, by certain merchants driven thither by the fortune of the sea and obliged to remain there and dress their victuals by making a fire in the ground. There being great abundance of the herb kali in that vicinity, the ashes of the plant, mixed and incorporated with the sand formed glass.

Boerham says, that the art of glass making is of ancient origin, being first cultivated in Egypt, while glass was rendered malleable in the age of Tiberius, and is now manufactured in the greatest perfection. It is one of the most useful arts to mankind; for by it, in conjunction with the grinder's help, we obviate the natural infirmities of the eye. Without it, old people, and those whose optic nerves are affected, would be debarred the knowledge of reading letters or books, and would be unable to sit within doors, or in a coach or ship and see all things clearly around them, yet without being exposed either to the scourging heat or freezing cold, or being annoyed with the east wind, or the ingress of extraneous filth. Pure glass will scarcely receive any stain, and is easily cleansed again. Although the essential constituents of glass are silex an alkali, it generally contains other substances, such as metallic oxides, which are designed to modify its external character of hardness, fusibility, brilliancy, color and transparency. Many kinds of glass contain either potash or soda—the first is not much employed by the manufacturers of common glass. Some kinds contain lime and oxide of lead and alumina and oxide of iron; the two latter are however mere accidental impurities. The following constitute the principal materials of glass:

1. Silex, or sand, which is, as already stated, very abundant on the globe; the sand mostly employed is the white sand, either obtained from the disintegrated sand-stone rocks, which are numerous in the United States, as in Missouri, near St. Genevieve, and Berkshire County, Mass.; or from the river sand, which is found in large beds of white sand at Maurice River, in N. J., and Florida. Drift sand is brought by the winds from the sea coasts or deserts, but mostly from the lower sands of seashores, as we find them for 100 miles on the Long Island shore; this sand when washed forms a good sand for glass.

The infusorial deposits of the silicious shells, called the diatoms, which form immense deposits both inland and on the coasts, yield a good material for the manufacture of glass.

2. Alkali. If potash is used, the purified pearlash is employed, particularly for plate glass and the fewer kinds of crown glass, as also *soda ash*, which is the carbonate of soda, is also used for the better qualities of glass; while sulphate of potash, glauber salt, salt-cake, or common salt are employed for common glass.

3. Lime, either as air-slacked, quick lime, or as carbonate of lime, such as marble or chalk, is used for the manufacture of green glass.

4. Oxide of lead, or litharge, or red lead, are usefully employed in the manufacture.

5. Certain materials are used for improving or purifying the glass, such as the binoxide of manganese, nitre, and arseneous acid, white arsenic. Oxide of lead, in the form of minium, is principally used in flint glass, as it increases its brilliancy, the purity of its color and the power of its refraction. The binoxide of manganese, was formerly known as glass-maker's soap; its effect is ascribed to the facility with which it gives up its oxygen, which combines with the coloring principles and destroys them. In other words, it converts the protoxide of iron, which would give the glass a dark green color, into a sesqueoxide, which is of higher oxidation and which leaves the glass cleaner.

Borax and boracic acid, as also the borate of lime, called Hayesine, from Peru, are like the Chili saltpeter, very useful and powerful agents for accelerating the fluxing of the silex.

The silex mostly used in England is sea sand, and not river sand, as is extensively used in the United States; it consists chiefly of quartz, and the finest qualities are obtained from Alum Bay, in the Isle of Wight, and from near Lyon, on the coast of Norfolk; the black flint, when raised to a red heat, and plunged in cold water, is frequently used, and probably gave the name to a species of glass, flint glass or crystal glass.

The color is imparted to glass by the application of the metallic oxides, and when the coloring is put into the pot so as to pervade the mass, it is termed pot metal, in distinction of such colors as are in the form of enamel or coating on the outside of the various utensils, such as sticks, plates and ornaments.

The *oxide of cobalt* produces a blue color.

Per-oxide of manganese produces a violet color.

Oxide of antimony produces a yellow color.

Oxide of uranium, a canary or opaline greenish color.

Cassius purple, or oxide of gold, produces a pink, or pink red color, also called the ruby color.

Oxide of chromium produces green.

Copper or *protoxide*, produces a dark red or ruby color, while the

Copper oxide, or black copper, produces a green color.

Silver produces a pure and beautiful yellow, but it can only be produced in the fire of a muffle, and that by staining the surface.

[TO BE CONTINUED.]

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THE MINES OF COLORADO;

BY OVANDO J. HOLLISTER,

LATE EDITOR AND PROPRIETOR COLORADO MINING JOURNAL.

The approaching completion of two lines of railway between the Mississippi Valley and the Rocky Mountains, will mark an era in the history of the nearer of the mining Territories—Colorado. It will infuse new life into mining, by giving safe, quick and reliable communication, reducing freights and risks, thus cheapening supplies and furnishing a most necessary competition in the labor market, under which the production of the precious metals will be largely increased and the value and importance of property of all kinds proportionally enhanced. This cannot fail to arrest the attention of capitalists who are interested in Colorado gold and silver stocks, or are thinking of becoming so. It will be of yet more benefit to that large class whose capital is their muscle, because it will make accessible to them a new and large tract of virgin land, which, though far West, is still on the World's great highway, and therefore in no sense of the word in the backwoods. This region has a pleasant and healthy climate, and while its soil is unsurpassed in strength by that of the prairie States, it has a superior market in the adjoining mines. It most eloquently invites settlement and improvement. It will also give the Summer tourist a choice between the West and the East. It is not hazarding much to say that the Rocky Mountains offer the most delightful Summer resort of the New if not of the Old World. The climate is cool and bracing, the air deliciously pure and soft, the scenery both grand and beautiful, the forests full of game and the streams of trout, with hot mineral springs of high medicinal value boiling up at the root of every shade tree in the sequestered parks. The annexations of the Rocky Mountains to the Union by railways will open a new world to science, a new field of adventure to money and muscle, a new and pleasant place of Summer resort to people of leasure.

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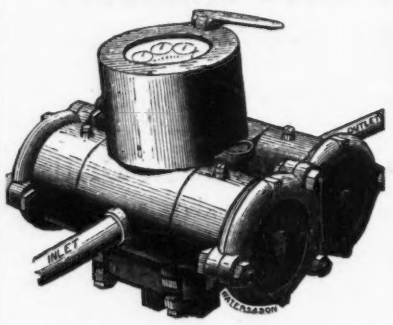

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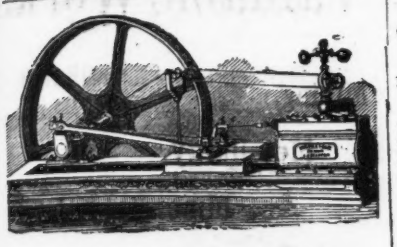

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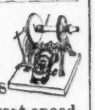

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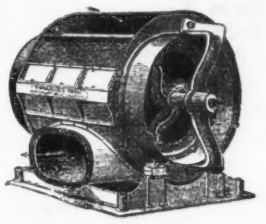

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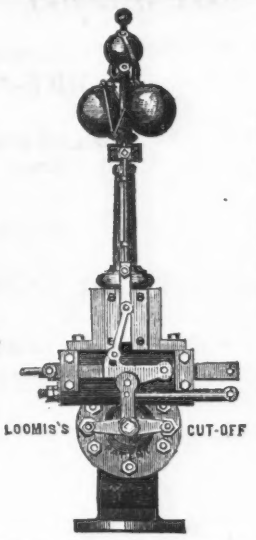

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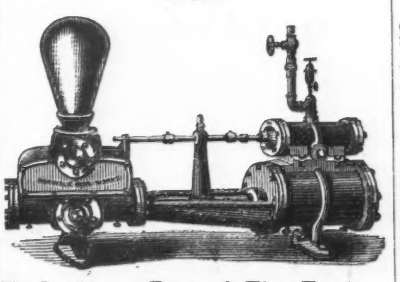

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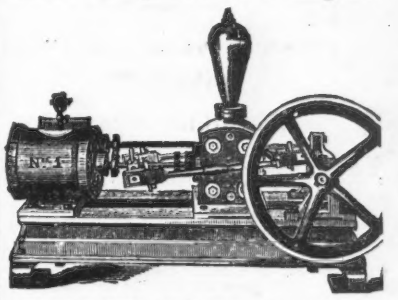

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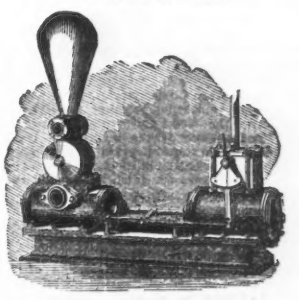

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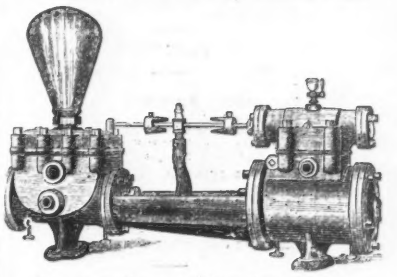

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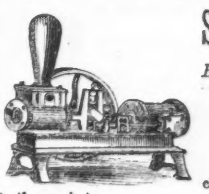

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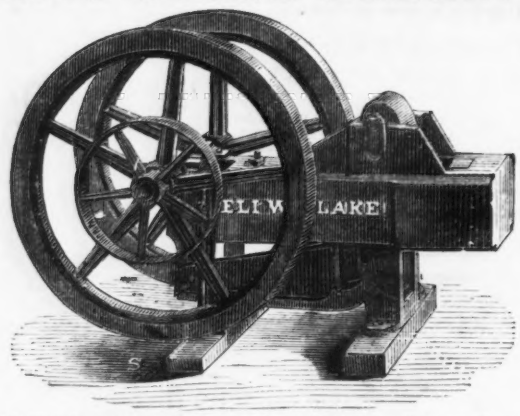

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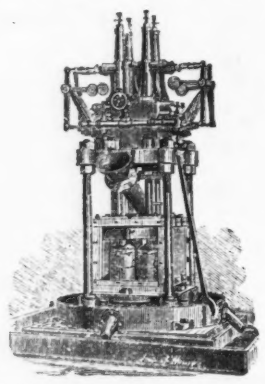

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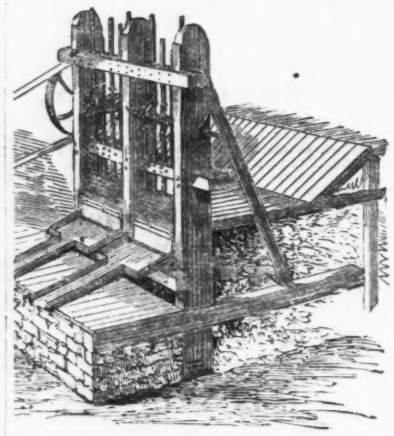

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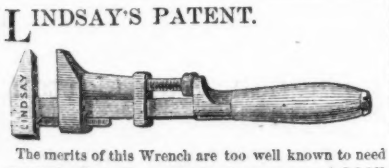

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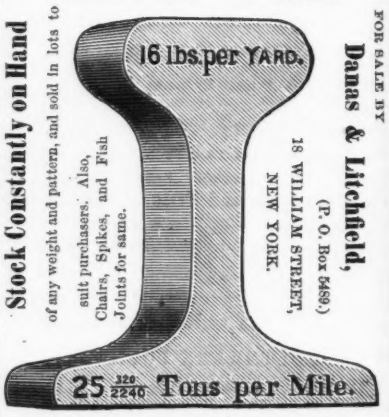

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